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REMOVAL SUPPORT TEAM 3
EPA CONTRACT EP-S2-14-01

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February 26, 2015

Ms. Margaret Gregor, On-Scene Coordinator
U.S. Environmental Protection Agency, Region II
Removal Action Branch
2890 Woodbridge Avenue
Edison, NJ 08837

EPA CONTRACT No.: EP-S2-14-01

TDD No.: TO-0001-0114

DOCUMENT CONTROL No.: RST3-01-F077

**SUBJECT: FINAL SITE-SPECIFIC HEALTH AND SAFETY PLAN – COLUMBIA
SMELTING & REFINING WORKS SITE, BROOKLYN, KINGS COUNTY,
NEW YORK**

Dear Ms. Gregor,

Enclosed please find the Final Site-Specific Health and Safety Plan (HASP) for the Removal Assessment to be conducted at the Columbia Smelting & Refining Works Site located in Brooklyn, Kings County, New York beginning on March 2, 2015. The U.S. Environmental Protection Agency comments to the draft version of this deliverable have been incorporated. If you have any questions or comments, please do not hesitate to contact me at (908) 565-2987.

Sincerely,
Weston Solutions, Inc.

A handwritten signature in black ink, appearing to read "Michael Beuthe".

Michael Beuthe
RST 3 Site Project Manager

Enclosure

cc: TDD File No.: TO-0001-0114

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In association with Scientific and Environmental Associates, Inc.,
Environmental Compliance Consultants, Inc., Avatar Environmental, LLC,
On-Site Environmental, Inc., and Sovereign Consulting, Inc.



**REGION II RST 3 HEALTH AND SAFETY PLAN
EMERGENCY RESPONSE/REMOVAL ASSESSMENT/REMOVAL ACTION
(Revised 16 March 2011)**

TDD No. TO-0001-0114

Site Name: Columbia Smelting & Refining Works

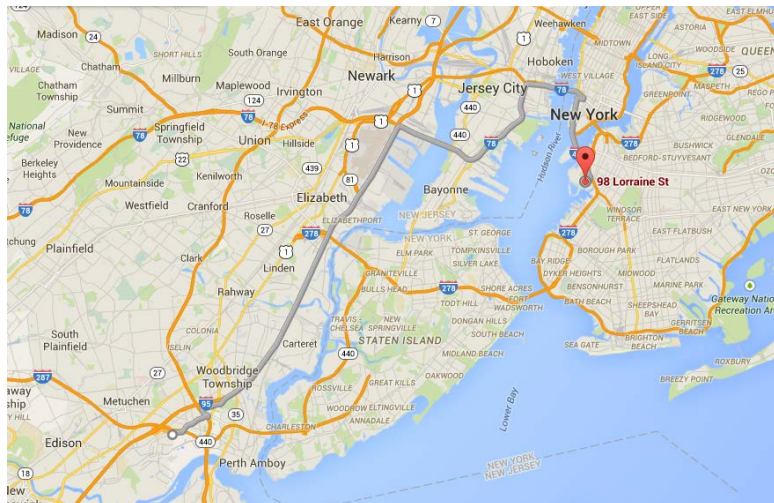
Site Address: Street: 98 Lorraine Street
City: Brooklyn
County/State: Kings/New York

Directions to Site from Office:

**1090 King Georges Post Rd
Edison, NJ 08837**

- | | |
|---|---------|
| 1. Turn right onto King Georges Post Road | 1.8 mi |
| 2. Take the ramp to I-95 N/New Jersey Turnpike N | 8.8 mi |
| 3. Take exit 13 for Interstate 278 toward Elizabeth/Goethals Br/Verrazano Br. | 17.2 mi |
| 4. Keep right at fork to stay on 278 E, follow signs for Bklyn Qns
Expressway/Triboro Bridge | 0.6 mi |
| 5. Take exit 26 to merge onto Hamilton Avenue | 0.2 mi |
| 6. Turn left onto Woodhull St | 0.2 mi |
| 7. Turn slight left onto Hamilton Ave. | 0.08 mi |
| 8. Turn right onto Columbia St. | 0.4 mi |
| 9. Turn left onto Lorraine St. | 0.1 mi |
| 10. 98 LORRAINE ST is on the right. | |

Destination is approximately 30.8 miles, about 45 minutes



***This map is subject to Google's Terms of Service, and Google is the owner of rights therein.*

Historical/Current Site Information:

The U.S. Environmental Protection Agency (EPA) Removal Action Branch is conducting a Removal Site Evaluation for the Columbia Smelting & Refining Works Site (the Site), a potential historic lead smelter facility which was referred to EPA between 2012 and 2014 by the New York State Department of Environmental Conservation (NYSDEC) along with 39 other potential historic lead smelter sites. The Site was included on a list of hundreds of locations nationwide where secondary lead smelting or alloying may have been conducted between 1931 and 1964, according to entries in historical trade publications. The list was originally compiled by William P. Eckel in a doctoral dissertation for George Mason University, and the research was summarized in the article “Discovering Unrecognized Lead-Smelting Sites by Historical Methods,” (Eckel et al., 2001).

The Site is located at 98 Lorraine Street in the Red Hook neighborhood of Brooklyn, Kings County, New York in a mixed residential, commercial and industrial area. It is the northwest portion of a 4.17-acre city block (Block 581, Lot 1) developed with four baseball diamonds (field numbers 5, 6, 7 and 8) and two cricket courts as part of Red Hook Park. Red Hook Park is a 58-acre property and the historic facility footprint is located within Zone 4 of the park. The footprint of the historic on-site facility is developed with a baseball diamond (Ball Field #7) and associated fencing, benches, walkways, landscaping and a water fountain. Bare soil is present on-site in the vegetated and partially grass-covered areas as well as the baseball diamond itself. The Site block is bordered by Lorraine, Henry, Bay, and Hicks Streets to the north, east, south and west, respectively. The Site is surrounded by a large residential public housing complex (Red Hook Houses) to the north, a community pool (Red Hook Pool) associated with Red Hook Park to the east, the remainder of Red Hook Park and associated recreational areas and athletic fields to the south, and residences as well as a condemned former industrial plant to the west. A daycare center (Bumble Bee Daycare) is present among the residences to the west, and playgrounds are present within the residential complex to the north. Exposed soil is present throughout the surrounding properties, especially throughout the housing complex and park areas. Available wind rose charts indicate that the prevailing winds in the direction of the Site are to the southeast, with limited components to the north and southwest.

According to historical sources, the Site was occupied by smelting and refining companies from the late 1920s through the late 1930s, including Delevan Smelting & Refining Co. in the late 1920s and Columbia Smelting & Refining Works from at least 1931 through the late 1930s. The Site was developed with a single-story, approximately 14,000 square foot building from the mid-to late 1920s until it was demolished prior to 1940. A 1931 advertisement in the Standard Metal Directory for Columbia Smelting & Refining Works, Incorporated of 98-106 Lorraine Street indicated that the company dealt with white metals and alloys as well as brass and bronze ingots. The ad indicated that the company manufactured soft lead, antimonial lead, Babbitts, solder, type metals, terse metal, Britannia metal, die-cast metal, unbreakable metal and rerun zinc; consumed pig percentage metal, cable lead, battery plates, soft lead, type metals, Babbitt, joists, pewter and dresses; and dealt in pig tin, pig lead, copper, antimony, aluminum, spelter, scrap metals and residues. A 1938 Sanborn map indicated that eight furnaces were present in the historic on-site building, and that it was being utilized as a refinery.

Since demolition of the historic Site building in the late 1930s, the Site has been utilized as a park and/or baseball field dating back to the early 1940s. Soil sampling on-site and in the vicinity was conducted by the EPA Pre-Remedial Branch and Weston Solutions, Inc. (Weston) Site Assessment Team (SAT) on October 15 and 16, 2014 (Sampling Trip Report DCN R2-A-47), following the same sampling protocols utilized for sampling at other potential historic smelter sites on the aforementioned Eckel list. Results indicated that there was a release of Site-related contaminants on-site and in the downwind areas. The extent of the contamination must therefore be further defined in preparation for a potential Removal Action.

RST 3 Scope of Work:

As part of the EPA Removal Assessment of the Site, Weston's Removal Support Team 3 (RST 3) is tasked with collecting up to 158 composite and grab soil samples, including Quality Assurance/Quality Control (QA/QC) samples, from up to 30 locations at the intervals of 0-1, 1-6, 6-12, 12-18, and 18-24 inches below ground surface (bgs). The samples will be collected to determine if historic operations have impacted the soils at the Site and surrounding properties. The soil samples collected will be submitted to the EPA Division of Environmental Science and Assessment (DESA) laboratory for analyses of target analyte list (TAL) metals and tin. Soil samples will be collected in 8-oz glass jars (as requested by the lab). The soil samples will be collected for a definitive data QA Objective. Field duplicate and Matrix Spike/Matrix Spike Duplicate (MS/MSD) soil samples will be collected at a frequency of one per 20 samples. A rinsate blank sample will be collected on each day of soil sampling activities to demonstrate adequate decontamination of non-dedicated sampling equipment (*i.e.*, hand augers and shovels).

Three (3) S.M.A.R.T. Health and Safety Goals for the Project (Simple, Measurable, Actionable, Reasonable, & Timely):

1. Avoid accidents by driving safely to and from the Site and when backing up.
2. Be cautious of slip, trip, and fall hazards, especially while working in and around uneven ground surfaces.
3. Use caution and rotate job tasks to prevent strains and sprains while shoveling and hand augering and carrying equipment.

Incident Type:

- ☐ Emergency Response
- ☒ Removal Assessment – March 2015
- ☐ Removal Action
- ☒ Soil Sampling – March 2015
- ☐ PRP Oversight
- ☐ Other

Location Class:

- ☒ Industrial
- ☐ Commercial
- ☒ Urban/Residential
- ☐ Rural

U.S. EPA OSC: Margaret Gregor

Original HASP: Yes

Lead RST 3: Michael Beuthe

Date of Initial Site Activities: 3/2/2015

Site Health & Safety Coordinator: Michael Beuthe

Site Health & Safety Alternate: Bernard Nwosu

Response Activities/Dates of Response (fill in as applicable)

Emergency Response:

- ☐ Perimeter Recon -
- ☐ Site Entry -
- ☐ Visual Documentation -
- ☐ Multi-Media Sampling -
- ☐ Decontamination -

Removal Assessment:

- ☐ Site XRF Screening
- ☒ Site Entry – March 2015
- ☒ Visual Documentation- March 2015
- ☒ Multi-Media Sampling – March 2015
- ☒ Decontamination – March 2015

Removal Action:

- ☐ Perimeter Recon
- ☐ Site Entry
- ☐ Visual Documentation
- ☐ Multi-Media Sampling
- ☐ Decontamination

Physical Safety Hazards to Personnel:

- | | | |
|---|---|---|
| <input checked="" type="checkbox"/> Inclement Weather – Attach FLD02 | <input type="checkbox"/> Heat – Attach FLD05 | <input checked="" type="checkbox"/> Cold – Attach FLD06 |
| <input type="checkbox"/> Confined Space – Attach FLD08 | <input type="checkbox"/> Industrial Trucks – Attach FLD09 | <input checked="" type="checkbox"/> Manual Lifting – Attach FLD10 |
| <input type="checkbox"/> Terrain – Attach FLD11 | <input type="checkbox"/> Structural Integrity – Attach FLD13 | <input checked="" type="checkbox"/> Site Security |
| <input type="checkbox"/> Pressurized Containers, Systems – Attach FLD16 | <input type="checkbox"/> Use of Boats – Attach FLD18 | <input type="checkbox"/> Waterways – Attach FLD19 |
| <input type="checkbox"/> Explosives – Attach FLD21 | <input type="checkbox"/> Heavy Equipment – Attach FLD22 | <input type="checkbox"/> Aerial Lifts and Manlifts – Attach FLD24 |
| <input type="checkbox"/> Elevated Surfaces and Fall Protection – Attach FLD25 | <input type="checkbox"/> Ladders – Attach FLD26 | <input type="checkbox"/> Excavations/Trenching – Attach FLD28 |
| <input type="checkbox"/> Fire Prevention – Attach FLD31 | <input type="checkbox"/> Demolition – Attach FLD33 | <input checked="" type="checkbox"/> Underground/Overhead Utilities – Attach FLD34 |
| <input checked="" type="checkbox"/> Hand and Power Tools – Attach FLD38 | <input type="checkbox"/> Illumination – Attach FLD39 | <input type="checkbox"/> Storage Tanks – Attach FLD40 |
| <input checked="" type="checkbox"/> Lead Exposure – Attach FLD46 | <input checked="" type="checkbox"/> Sample Storage – Attach FLD49 | <input type="checkbox"/> Cadmium Exposure – Attach FLD50 |
| <input type="checkbox"/> Asbestos Exposure – Attach FLD52 | <input type="checkbox"/> Hexavalent Chromium Exposure – Attach FLD 53 | <input type="checkbox"/> Benzene Exposure – Attach FLD 54 |
| <input type="checkbox"/> Drilling Safety – Attach FLD56 | <input type="checkbox"/> Drum Handling – Attach FLD58 | <input type="checkbox"/> Gasoline Contaminant Exposure – Attach FLD61 |
| <input type="checkbox"/> Noise – Attach CECHSP, Section 7 | <input checked="" type="checkbox"/> Walking/Working Surfaces | <input type="checkbox"/> Oxygen Deficiency |
| <input type="checkbox"/> Unknowns in Tanks or Drums | <input type="checkbox"/> Nonionizing Radiation | <input type="checkbox"/> Ionizing Radiation Attach FLD63 |

Biological Hazards to Personnel:

- | | |
|---|---|
| <input type="checkbox"/> Infectious/Medical/Hospital Waste – Attach FLD 44 and 45 | <input checked="" type="checkbox"/> Non-domesticated Animals – Attach RST 3 FLD43 |
| <input type="checkbox"/> Insects – Attach RST 3 FLD 43 | <input type="checkbox"/> Poisonous Plants/Vegetation – Attach RST 3 FLD 43D |
| <input type="checkbox"/> Raw Sewage | <input type="checkbox"/> Bloodborne Pathogens – Attach FLD 44 and 45 |

Training Requirements:

- | | |
|---|--|
| <input checked="" type="checkbox"/> 40-Hour HAZWOPER Training with three days supervised experience | <input type="checkbox"/> 8-Hour Management or Supervisor Training in addition to basic training course |
| <input checked="" type="checkbox"/> 8-Hour Annual Refresher Health and Safety Training | <input type="checkbox"/> Site Specific Health and Safety Training |
| <input type="checkbox"/> DOT (CMV Training - ERV in Use) | <input type="checkbox"/> Bio-Medical Collection and Response |

Medical Surveillance Requirements:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Baseline initial physical examination with physician certification | <input checked="" type="checkbox"/> Annual medical examination with physician certification |
| <input type="checkbox"/> Site-specific medical monitoring protocol (Radiation, Heavy Metals) | <input type="checkbox"/> Asbestos worker medical protocol |

Vehicle Use Assessment and Selection:

Driving is one of the most hazardous and frequent activities for Weston Employees. As such, Weston Employees are required to adhere to established safe operating practices in order to maintain their eligibility to drive Weston owned, leased, or rented vehicles. Every person riding in a Weston vehicle, including passengers must maintain a commitment for a safe journey. This means being attentive while in the vehicle and helping the driver to notice hazards ahead of and around the vehicle and ensure that their presence does not distract the driver from safely operating the vehicle.

A high percentage of vehicle accidents occur when operating in reverse. Anytime a vehicle is operated in reverse, e.g., backing out of a parking area, if there are passengers, at least one of them are to assist the driver by acting as a guide person during the reverse movement or during other vehicle operation where it would be prudent to have a guide person(s) participate in the vehicle movement. When practical, the preferred parking method would be to back into the parking area.

At a minimum, each Weston Driver must:

- Possess a current, valid drivers' license
- Current Commercial Motor Vehicle (CMV) card when operating the Emergency Response Vehicle
- Obey posted speed limits and traffic laws
- Wear seat belts at all times while the vehicle is in operation
- Conduct a 360 degree inspection around the vehicle before attempting to drive the vehicle

- Report accidents / incidents immediately and complete a Notice of Incident (NOI)
- Keep vehicles on approved roadways (4WD does not guarantee mobility on unapproved surfaces)

All Region II RST 3 personnel are experienced and qualified to drive RST 3 fleet vehicles (Tahoe, Suburbans, Minivan/Cargo Van, and Emergency Response Vehicle). However, in the event that vehicle rental is required, each person must take the time to familiarize themselves with that particular vehicle. This familiarization includes adjustment of the dashboard knobs/controls, mirrors, steering wheel, seats, and a 360 degree external inspection of the vehicle.

1. The following vehicles are anticipated to be used on this project:

- | | |
|---|---|
| <input type="checkbox"/> Car | <input type="checkbox"/> Pickup Truck |
| <input type="checkbox"/> Intermediate/Standard SUV
(e.g. Chevy Trailblazer, Chevy Tahoe, Ford Explorer, Ford Escape) | <input checked="" type="checkbox"/> Full Size SUV (e.g. Chevy Suburban, Ford Expedition, GMC Yukon) |
| <input checked="" type="checkbox"/> Minivan/Cargo Van (e.g. Chevy Uplander, Chevy Express Van) | <input type="checkbox"/> Box Truck (Size: _____) |
| <input type="checkbox"/> Emergency Response Vehicle (ERV) | <input type="checkbox"/> Other _____ |

2. Are there any on-site considerations that should be noted:

- | | | | |
|--|---|--|--|
| <input checked="" type="checkbox"/> Working/Driving Surfaces | <input type="checkbox"/> Debris | <input type="checkbox"/> Overhead Clearance | <input type="checkbox"/> Obstructions |
| <input checked="" type="checkbox"/> Tire Puncture Hazards | <input type="checkbox"/> Vegetation | <input type="checkbox"/> Terrain | <input checked="" type="checkbox"/> Parking |
| <input checked="" type="checkbox"/> Congestion | <input type="checkbox"/> Site Entry/Exit Hazards | <input checked="" type="checkbox"/> Local Traffic Volume | <input checked="" type="checkbox"/> Security |
| <input type="checkbox"/> Heavy Equipment | <input checked="" type="checkbox"/> Time/Length of Work Day | <input type="checkbox"/> Other: | |

Do any of the considerations above require further explanation: No

3. Was the WESTON Environmental Risk Management Tool completed in EHS? Yes

Was an Environmental Compliance Plan required? No

4. Are there any seasonal considerations that should be noted (e.g., Anticipated Snowy Conditions): Yes, there is the potential for snowy and icy driving conditions during the winter months.

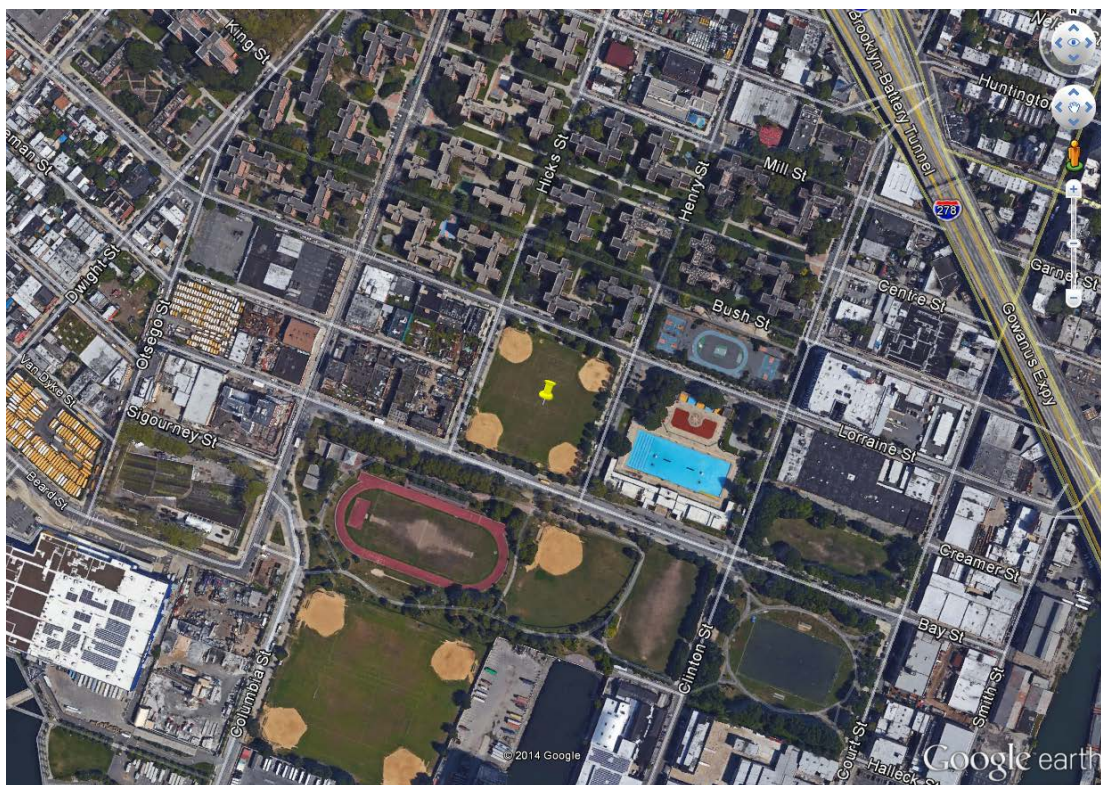
5. Is a Traffic Control Plan required?

☐ Yes ☒ No

Chemical Hazards to Personnel

Physical Parameters	Chemical Contaminant Lead CAS [7439-92-1]	Chemical Contaminant Tin CAS [7440-31-5]
Exposure Limits IDLH Level	<p>_____ ppm <u>0.050</u> mg/m³ PEL</p> <p>_____ ppm <u>0.050</u> mg/m³ TLV / REL</p> <p>_____ ppm <u>100</u> mg/m³ IDLH</p>	<p>_____ ppm <u>2</u> mg/m³ PEL</p> <p>_____ ppm <u>2</u> mg/m³ TLV / REL</p> <p>_____ ppm <u>100</u> mg/m³ IDLH</p>
Physical Form (Solid/Liquid/Gas)	<u>X</u> Solid ____ Liquid ____ Gas	<u>X</u> Solid ____ Liquid ____ Gas
Color	A heavy, ductile, soft, gray solid color	Gray to almost silver-white, ductile, malleable, lustrous solid.
Odor	Odorless	Odorless
Flash Point Flammable Limits	<p><u>N/A</u> _____ Degrees F or C</p> <p><u>NA</u> _____ % UEL <u>NA</u> _____ % LEL</p>	<p><u>N/A</u> _____ Degrees F or C</p> <p><u>NA</u> _____ % UEL <u>NA</u> _____ % LEL</p>
Vapor Pressure	<u>0</u> mm/Hg	<u>0</u> mm/Hg
Vapor Density	<u>NA</u> Air = 1	<u>NA</u> Air = 1
Specific Gravity	_____ <u>11.34</u> Water = 1	_____ <u>7.28</u> Water = 1
Solubility	Insoluble	Insoluble
Incompatible Material	Strong Oxidizers, hydrogen peroxide, acids	Strong Oxidizers, hydrogen peroxide, acids
Routes of Exposure	<p><u>X</u> Inh _____ Abs</p> <p><u>X</u> Con <u>X</u> Ing</p>	<p><u>X</u> Inh ____ Abs</p> <p><u>X</u> Con <u>X</u> Ing</p>
Symptoms of Acute Exposure	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia; weight loss; malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; irritation eyes, hypertension	Irritation eyes, skin, respiratory system; in animals: vomiting, diarrhea, paralysis with muscle twitching
First Aid Treatment	<p>Eye: Irrigate immediately</p> <p>Skin: Soap wash immediately</p> <p>Breathing: Respiratory support</p> <p>Swallow: Medical attention immediately</p>	<p>Eye: Irrigate immediately</p> <p>Skin: Soap wash immediately</p> <p>Breathing: Respiratory support</p> <p>Swallow: Medical attention immediately</p>
Ionization Potential	<u>N/A</u> _____ eV	<u>N/A</u> _____ eV
Instruments for Detection	<p>_____ PID w/ _____ Probe</p> <p>_____ FID _____ CGI _____ RAD</p> <p>_____ Det Tube _____ Other</p> <p>_____ Lumex</p> <p>NIOSH 7082, NIOSH 7300</p>	<p>_____ PID w/ _____ Probe</p> <p>_____ FID _____ CGI _____ RAD</p> <p>_____ Det Tube _____ Other</p> <p>_____ Lumex</p> <p>NIOSH 7300, NIOSH 7301, NIOSH 7303, OSHA ID121, OSHA ID206</p>

Site Map with Work Zones: Work zones are currently unknown. The appropriate work zones will be determined on-site based on the proposed sampling area.



****This map is subject to Google's Terms of Service, and Google is the owner of rights therein.**

Work Zone Definitions:

Exclusion Zone – The Exclusion Zone is the area where contamination is either known or expected to occur and the greatest potential for exposure exists. The outer boundary of the Exclusion Zone, called the Hotline, separates the area of contamination from the rest of the Site.

Contamination Reduction Zone (CRZ) – The CRZ is the area in which decontamination procedures take place. The purpose of the CRZ is to reduce the possibility that the Support Zone will become contaminated or affected by the site hazards.

Support Zone – The Support Zone is the uncontaminated area where workers are unlikely to be exposed to hazardous substances or dangerous conditions. The Support Zone is the appropriate location for the command post, medical station, equipment and supply center, field laboratory, and any other administrative or support functions that are necessary to keep site operations running efficiently.

Communications:

- | | | | |
|-------------------------------------|--------------------------|-------------------------------------|-----------------------------|
| <input checked="" type="checkbox"/> | Buddy System | <input type="checkbox"/> | Radio |
| <input type="checkbox"/> | Air Horn for Emergencies | <input checked="" type="checkbox"/> | Hand Signals/Visual Contact |

Personnel Decontamination Procedures:

- ☐ Wet Decontamination (procedures as follows)
- ☒ Dry Decontamination (procedures as follows)

Soil sampling activities conducted as part of the Removal Assessment will be conducted in Level D personal protective equipment (PPE). All used PPE will be grossly decontaminated and disposed of in accordance with applicable federal, state, and local regulations.

Equipment Decontamination Procedures:

- ☐ None
- ☒ Wet Decontamination (procedures as follows)
- ☐ Dry Decontamination (procedures as follows)

Non-dedicated sampling equipment, including hand augers and shovels, will be decontaminated on site as follows:

1. Alconox detergent and potable water scrub.
2. Potable water rinse.
3. Deionized water rinse.
4. Air dry (sufficient time will be allowed for the equipment to completely dry).
5. Deionized water rinse and air dry.

Refer to EPA Emergency Response Team (ERT) Standard Operating Procedure (SOP)#: 2006 – Sampling Equipment Decontamination.

Per the request of the EPA On-Scene Coordinator (OSC), all decontamination fluids will be disposed of on site. All disposable sampling equipment will be void of gross contamination, double bagged, and disposed of in accordance with applicable federal, state, and local regulations.

Adequacy of decontamination determined by: RST 3 On-Site Health and Safety Officer.

Personal Protective Equipment

TASK TO BE PERFORMED	ANTICIPATED LEVEL OF PROTECTION	TYPE OF CHEMICAL PROTECTIVE COVERALL	INNER GLOVE / OUTER GLOVE / BOOT COVER	APR CARTRIDGE TYPE or SCBA
Soil Sampling	Level D	None	Nitrile gloves/Latex Booties/Steel Toe Boots/Safety Glasses	None
Site Documentation	Level D	None	Nitrile gloves/Latex Booties/Steel Toe Boots/Safety Glasses	None

Hazard Task Analysis

RISK LEVEL (High, Medium, Low)	HAZARD	RECOGNITION/ SYMPTOMS	MITIGATION	LEVEL OF PROTECTION
Medium	Strains and sprains from manual lifting and sample collection (i.e., use of hand augers and shovels)	Objects heavier than 35 pounds, large and oddly shaped objects regardless of weight, pinch points and tight spaces, wet or slippery surfaces.	<ul style="list-style-type: none"> • Use proper lifting techniques such as keeping straight back, lifting with legs, avoid twisting back. • Use mechanical equipment or get help from others. • Ensure that all samplers are familiar with the tools and equipment selected for sample collection. • All samplers should be able to demonstrate to the sampling lead they are familiar with the tools and their function. • Rotate task among workers so no one worker is collecting all the samples. Allow for rest breaks. • See FLD 10. 	Level D

Hazard Task Analysis (Concluded)

RISK LEVEL (High, Medium, Low)	HAZARD	RECOGNITION/ SYMPTOMS	MITIGATION	LEVEL OF PROTECTION
Low	Exposure to contaminants	Contact with contaminated soil and dirty or leaking sample containers.	<ul style="list-style-type: none"> • Wear required PPE, including nitrile gloves, as specified in this HASP. • Follow all equipment decontamination procedures for reusable equipment. • Handle all glassware with care. Bottles may break if dropped; use leather gloves when cleaning up broken glass. • Ensure that each container top is securely tightened. Pack each container in a manner to prevent damage to container during handling of shipping box and during transportation. 	Level D
Low	Slips, trips, falls around uneven surfaces	Unsure or unstable footing and walking, safely navigate walking/working surfaces.	<ul style="list-style-type: none"> • Visually inspect work areas and mark, barricade, or eliminate slip, trip, and fall hazards. • Avoid walking on uneven surfaces, if possible. 	Level D
Low	Driving	Vehicular loss of control i.e. swerving or skidding into traffic or pedestrians.	<ul style="list-style-type: none"> • Maintain eyes on road while moving; check rear view mirrors and side mirrors when backing up and changing lanes. • Wear seat belt and make sure there is a line of sight in all directions. 	Seat Belt and Driver Airbags

Frequency and Types of Air Monitoring: Not Applicable

☐ Continuous

☐ Routine - _____

☐ Periodic -

DIRECT READING INSTRUMENTS	MultiRAE CGI / O ₂ / H ₂ S / CL ₂ / CO / PID	MicroFID or TVA-1000	Drager Chemical Detector Tube	DustTrak	XRF
EQUIPMENT ID NUMBER	NA	NA	NA	NA	NA
CALIBRATION DATE	--	--	--	--	--
RST 3 PERSONNEL	--	--	--	--	--
ACTION LEVEL	<p>≥ 10 - 20% LEL (Confined Space / non- Confined Space)</p> <p>≤ 19.5%, O₂ Deficient ≥ 23%, O₂ Enriched</p> <p>H₂S – PEL: 20 ppm IDLH: 100 ppm</p> <p>Cl₂ – PEL: 1 ppm IDLH: 10 ppm</p>	<p>Unknowns: 1 - 5 Units - "Level C" 5-500 Units-"Level B"</p>	<p>PEL / TLV / IDLH: Compare with Drager Tube</p> <p>(See Chart Below)</p>	<p>Particulates > 0.025 mg/m³</p>	

Emergency Telephone Numbers

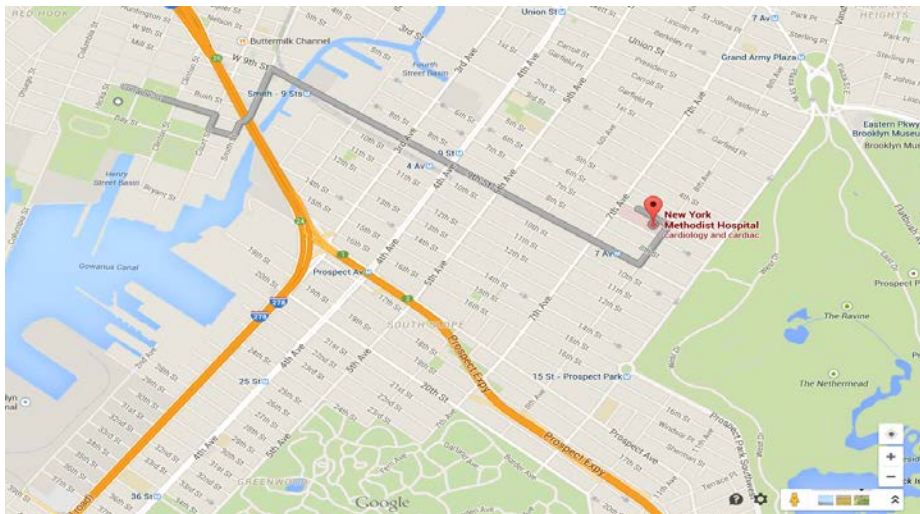
Emergency Contact	Location / Address	Telephone Number	Notified
Hospital	New York Methodist Hospital 506 6 th Street Brooklyn, NY 11215	Emergency: 911 Non-emergency: (718) 780-3000	No
Police	Brooklyn 76th Precinct Police 191 Union Street Brooklyn, NY 11231	Emergency: 911 Non-emergency: (718) 834-3211	No
Fire Department	FDNY Station 32 347 Bond Street Brooklyn, NY 11231	Emergency: 911 Non-emergency: (718) 999-2770	No

Chemical Trauma Capability? ☒ Yes ☐ No

If no, closest backup: _____ Phone: _____

Directions to New York Methodist Hospital

- | | |
|--|--------|
| 1. Head east on Lorraine St toward Henry St | 0.3 mi |
| 2. Take the 3rd right onto Court St | 249 ft |
| 3. Take the 1st left onto Creamer St | 367 ft |
| 4. Turn left onto Smith St | 0.2 mi |
| 5. Take the 3rd right onto 9th St | 1.2 mi |
| 6. Turn left onto 8th Ave | 0.1 mi |
| 7. Turn left at the 3rd cross street onto 6th St | 0.1 mi |



****This map is subject to Google's Terms of Service, and Google is the owner of rights therein.**

Route verified by: Michael Beuthe

Date: 1/9/2015

Additional Emergency Telephone Contacts

WESTON Medical Emergency Service Dr. Peter Greaney, Medical Director WorkCare 300 South Harbor Blvd, Suite 600 Anaheim, California 92805	800-455-6155 Regular Business Hours (9AM to 7:30PM) Dial 0 or Ext. 175 for Michelle Bui to request the on-call clinician. 800-455-6155 After Hours (Weekdays 7:31PM to 8:59AM, Weekends, Holidays) Dial 3 to reach the after-hours answering service. Request that the service connect you with the on-call clinician or the on-call clinician will return your call within 30 minutes.
Chemtrec	800-424-9300
ATSDR	404-639-0615
ATF (explosives information)	800-424-9555
National Response Center	800-424-8802
National Poison Control Center	800-764-7661
Chemtel	800-255-3924
DOT	800-424-8802
CDC	800-232-0124

Pre-Response Approval

HASP prepared by: Michael Beuthe

Date: 2/24/15

Pre-Response/Entry Approval by: _____

Date: __/__/__

Tasks Conducted	Level of Protection/Specific PPE Used
Soil Sampling	Level D/Nitrile gloves/Latex Booties/Steel Toe Boots/Safety Glasses
Site Documentation	Level D/Nitrile gloves/Latex Booties/Steel Toe Boots/Safety Glasses

Hazardous Waste Site and Environmental Sampling Activities

Off Site: ☐ Yes ☒ No

On Site: ☒ Yes ☐ No

Describe types of samples and methods used to obtain samples:

Soil sampling will be conducted as per EPA ERT SOP # 2001 General Field Sampling Guidelines, and SOP # 2012 Soil Sampling from the Compendium of ERT Soil Sampling and Surface Geophysics Procedures. Hand augers and shovels will be used to obtain soil samples at the 0-1, 1-6, 6-12, 12-18 and 18-24 inch depth interval from 30 locations.

Soil samples will be collected in plastic Ziploc™ bags using dedicated plastic scoops. The soil samples will be homogenized in the Ziploc™ bags and debris and rocks will be removed. The soil samples will then be transferred into an 8-oz. glass jars (as requested by the lab). The soil samples will be collected for a definitive data QA Objective. Field duplicate and MS/MSD soil samples will be collected at a rate of one per 20 per matrix for soil sampling, and one rinsate blank sample will be collected daily to demonstrate adequate decontamination of non-dedicated sampling devices (i.e. hand augers and shovels). All soil sample information will be entered into a Scribe database for the generation of the chain of custody and sample labels.

All stainless-steel equipment used during field sampling activities will be decontaminated in the field in accordance to EPA ERT SOP #2006 prior to and subsequent to sampling. Decontamination of sampling equipment will be conducted as follows:



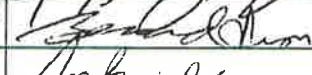


6. Alconox detergent and potable water scrub.
7. Potable water rinse.
8. Deionized water rinse.
9. Air dry (sufficient time will be allowed for the equipment to completely dry).
10. Deionized water rinse and air dry.

Was laboratory notified of potential hazard level of samples? ☒ Yes ☐ No


Note: The nature of the work assignment may require the use of the following procedures/programs which will be included as attachments to this HASP as applicable: Emergency Response Plan, Spill Containment Program.

Disclaimer: This HASP was prepared for work to be conducted under the RST 3 Contract EP-S2-14-01. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

PRINTED NAME	SIGNATURE	AFFILIATION	DATE
Michael Beuthe		Weston, RST3	2/26/15
Robert Crosby		Weston, RST3	2.26.15
Bernard Alvarn		Weston, RST3	3.3.15
Joseph Bundens		Weston, RST3	3/12/15
Margaret Gregor		EPA Region 2	2/26/15

Post-Response Approval

Final Submission of HASP by:		Date: 2/26/15
Post Response Approval by:		Date:
RST 3 HSO Review by:		Date:

Air Monitoring Summary Log

Date: __/__/__

Data Collected by: _____

Station/Location	CGI / O ₂ Meter / CL2 / H2S	PID	FID / TVA-1000	DustTrak	Other (_____)

ATTACHMENT A:
NIOSH POCKET GUIDES



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

Search the Pocket Guide

Enter search terms separated by spaces.

Lead					
Synonyms & Trade Names Lead metal, Plumbum					
CAS No. 7439-92-1		RTECS No. OF7525000 (/niosh-rtecs/OF72D288.html)		DOT ID & Guide	
Formula Pb		Conversion		IDLH 100 mg/m³ (as Pb) See: 7439921 (/niosh/idlh/7439921.html)	
Exposure Limits NIOSH REL *: TWA (8-hour) 0.050 mg/m³ See Appendix C (nengapdx.html) [*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.] OSHA PEL *: [1910.1025] TWA 0.050 mg/m³ See Appendix C (nengapdx.html) [*Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.]				Measurement Methods NIOSH 7082 (/niosh/docs/2003-154/pdfs/7082.pdf) , 7105 (/niosh/docs/2003-154/pdfs/7105.pdf) , 7300 (/niosh/docs/2003-154/pdfs/7300.pdf) , 7301 (/niosh/docs/2003-154/pdfs/7301.pdf) , 7303 (/niosh/docs/2003-154/pdfs/7303.pdf) , 7700 (/niosh/docs/2003-154/pdfs/7700.pdf) , 7701 (/niosh/docs/2003-154/pdfs/7701.pdf) , 7702 (/niosh/docs/2003-154/pdfs/7702.pdf) , 9100 (/niosh/docs/2003-154/pdfs/9100.pdf) , 9102 (/niosh/docs/2003-154/pdfs/9102.pdf) , 9105 (/niosh/docs/2003-154/pdfs/9105.pdf) ; OSHA ID121 (http://www.osha.gov/dts/sltc/methods/inorganic/id121/id121.html) , ID125G (http://www.cdc.gov/Other/disclaimer.html) , ID125G (http://www.osha.gov/dts/sltc/methods/inorganic/id125g/id125g.html) , ID206 (http://www.cdc.gov/Other/disclaimer.html) , ID206 (http://www.osha.gov/dts/sltc/methods/inorganic/id206/id206.html) , ID206 (http://www.cdc.gov/Other/disclaimer.html) See: NMAM (/niosh/docs/2003-154/) or OSHA Methods (http://www.osha.gov/dts/sltc/methods/index.html)	
				Physical Description A heavy, ductile, soft, gray solid.	
MW: 207.2	BP: 3164° F	MLT: 621°F	Sol: Insoluble	VP: 0 mmHg (approx)	IP: NA
Sp.Gr: 11.34	Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid in bulk form.					
Incompatibilities & Reactivities Strong oxidizers, hydrogen peroxide, acids					
Exposure Routes inhalation, ingestion, skin and/or eye contact					

Symptoms lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension

Target Organs Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue

Personal Protection/Sanitation (See [protection codes \(protect.html\)](#))

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: Daily

Remove: When wet or contaminated

Change: Daily

First Aid (See [procedures \(firstaid.html\)](#))

Eye: Irrigate immediately

Skin: Soap flush promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations

(See [Appendix E](#)) ([nengapdx.html](#))

NIOSH/OSHA

Up to 0.5 mg/m³:

(APF = 10) Any air-purifying respirator with an N100, R100, or P100 filter (including N100, R100, and P100 filtering facepieces) except quarter-mask respirators.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.

(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m³:

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode

(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.

Up to 2.5 mg/m³:

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.

(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode

(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter

(APF = 50) Any self-contained breathing apparatus with a full facepiece

(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m³:

(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Up to 100 mg/m³:

(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.

Any appropriate escape-type, self-contained breathing apparatus

[Important additional information about respirator selection \(pgintrod.html#mustread\)](#)

See also: [INTRODUCTION \(/niosh/npg/pgintrod.html\)](/niosh/npg/pgintrod.html) See ICSC CARD: [0052 \(/niosh/ipcsneng/neng0052.html\)](/niosh/ipcsneng/neng0052.html) See MEDICAL TESTS: [0127 \(/niosh/docs/2005-110/nmedo127.html\)](/niosh/docs/2005-110/nmedo127.html)

Page last reviewed: April 4, 2011

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Content source: [National Institute for Occupational Safety and Health \(NIOSH\)](#) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Road Atlanta, GA 30329-4027, USA
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Search the Pocket Guide

Enter search terms separated by spaces.

Tin					
Synonyms & Trade Names Metallic tin, Tin flake, Tin metal, Tin powder					
CAS No. 7440-31-5		RTECS No. XP7320000 (/niosh-rtecs/XP6FB1Co.html)		DOT ID & Guide	
Formula Sn		Conversion		IDLH 100 mg/m³ (as Sn) See: 7440315 (/niosh/idlh/7440315.html)	
Exposure Limits NIOSH REL *: TWA 2 mg/m³ [*Note: The REL also applies to other inorganic tin compounds (as Sn) except tin oxides.] OSHA PEL *: TWA 2 mg/m³ [*Note: The PEL also applies to other inorganic tin compounds (as Sn) except tin oxides.]				Measurement Methods NIOSH 7300  (/niosh/docs/2003-154/pdfs/7300.pdf), 7301  (/niosh/docs/2003-154/pdfs/7301.pdf), 7303  (/niosh/docs/2003-154/pdfs/7303.pdf); OSHA ID121 (http://www.osha.gov/dts/sltc/methods/inorganic/id121/id121.html)  (http://www.cdc.gov/Other/disclaimer.html), ID206 (http://www.osha.gov/dts/sltc/methods/inorganic/id206/id206.html)  (http://www.cdc.gov/Other/disclaimer.html) See: NMAM (/niosh/docs/2003-154/) or OSHA Methods (http://www.osha.gov/dts/sltc/methods/index.html)  (http://www.cdc.gov/Other/disclaimer.html)	
Physical Description Gray to almost silver-white, ductile, malleable, lustrous solid.					
MW: 118.7	BP: 4545°F	MLT: 449°F	Sol: Insoluble	VP: 0 mmHg (approx)	IP: NA
Sp.Gr: 7.28	FLP: NA	UEL: NA	LEL: NA		
Noncombustible Solid, but powdered form may ignite.					
Incompatibilities & Reactivities Chlorine, turpentine, acids, alkalis					
Exposure Routes inhalation, skin and/or eye contact					
Symptoms irritation eyes, skin, respiratory system; in animals: vomiting, diarrhea, paralysis with muscle twitching					
Target Organs Eyes, skin, respiratory system					
Personal Protection/Sanitation (See protection codes (protect.html)) Skin: No recommendation Eyes: No recommendation				First Aid (See procedures (firstaid.html)) Eye: Irrigate immediately Skin: Soap wash immediately	

Wash skin: No recommendation
Remove: No recommendation
Change: No recommendation

Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations
NIOSH/OSHA

Up to 10 mg/m³:

(APF = 5) Any quarter-mask respirator.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.*

Up to 20 mg/m³:

(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.*

(APF = 10) Any supplied-air respirator*

Up to 50 mg/m³:

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.*

Up to 100 mg/m³:

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.

(APF = 50) Any self-contained breathing apparatus with a full facepiece

(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.

Any appropriate escape-type, self-contained breathing apparatus

[Important additional information about respirator selection \(pgintrod.html#mustread\)](#)

See also: [INTRODUCTION \(/niosh/npg/pgintrod.html\)](#) See ICSC CARD: [1535 \(/niosh/ipcsneng/neng1535.html\)](#)

Page last reviewed: April 4, 2011

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ATTACHMENT B:

WESTON FLDS

FLD 02 INCLEMENT WEATHER

Hot weather (ambient temperatures over 70°F), cold weather (ambient temperatures below 40°F), rain, snow, ice, and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Extremes of heat, cold, and humidity, as well as rain, snow, and ice, can adversely affect monitoring instrument response and reliability, respiratory protection performance, and chemical protective clothing materials.

RELATED FLDs AND OP

FLD 05 – Heat Stress Prevention and Monitoring

FLD 06 – Cold Stress

OP 05-03-008 – Inclement Weather & Business Disruption Policy

PROCEDURE

The potential for exacerbating the impact of physical hazards must be considered for tasks that expose personnel to inclement weather. Risk assessment and hazards analysis should be accomplished during the planning stages of a project for the most likely inclement weather conditions that may be encountered, i.e., rain and lightning in late spring, summer, and early fall, or lightning prone areas; cold, snow, and ice in winter. The Field Safety Officer (FSO) must determine the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his/her work and be actively alert to these hazards. Managers and workers must be familiar with the requirements of FLD 05 and FLD 06.

A pre-site activity risk assessment must be completed when inclement weather occurs. Weather conditions that affect instruments and personal protective equipment (PPE) function must be conveyed to site workers who should monitor function and integrity of PPE and be alert to changing weather conditions. A decision must be made on the proper safety procedures to use if work must continue, or to stop work if the risk is too great. The appropriate Safety Professional **must be notified of all instances of the need to stop work for safety reasons, including inclement weather.**

Heat

Hot, dry weather increases risk of soil drying, erosion, and dust dispersion, which may present or increase risk of exposure and environmental impact from toxic hazards. Hot weather will increase pressure on closed containers and the rate of volatilization, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres.

Prevention and Protective Measures

Employees must be protected from airborne contaminants using engineering controls such as wetting dry soil to prevent particle dispersion, and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed PPE. Wind shifts and velocity should be measured where change may result in dispersion of airborne contaminants into the work area.

Rain, Wet Weather, and High Humidity

Wet conditions resulting from rain and wet weather increase slipping and tripping hazards, braking distances of vehicles, the potential for vehicle skidding, or difficulties in handling powered devices such as augers and drills. Rain fills holes, obscures trip and fall hazards, and increases risk of electrical shock

when working with electrical equipment. Changes in soil conditions caused by rain can impact trenching and excavating activities, creating the potential for quicksand formation, wall collapse, and cave-in. Vehicles become stuck in mud, and tools and personnel can slip on wet surfaces. Rain and wet conditions may decrease visibility (especially for personnel wearing respiratory protection) and limit the effectiveness of certain direct-reading instruments (e.g., photoionization detectors [PIDs]).

Feet that become wet and are allowed to remain wet can lead to serious problems under both heat and cold conditions. Activities that may result in wet feet include extended work in chemical protective clothing and wading in water/liquid during biological assessments. Trench foot, paddy foot, and immersion foot are terms associated with foot ailments resulting from feet being wet for long periods of time. All have similar symptoms and effects. Initial symptoms include edema (swelling), tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration. (NOTE: The following Preventive and Protective Measures also apply to Cold, Snow, and Ice.)

Preventive and Protective Measures

Walkways, stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow. Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials.

Vehicles used in rain or cold weather must have working windshield wipers and defrosters, and windows must be kept clear of obstruction.

Drivers must observe traffic laws, including maintaining speed within limits safe for weather conditions, and wearing seat belts at all times. Note that this may mean operating below the posted speed limit.

When walking, workers should use a walking stick or probe to test footing ahead where there is standing water, snow, or ice to protect the walker against stepping into potholes or onto puncture hazards, buried containers, or other potential structurally unsound surfaces.

Prior to using vehicles or equipment in off-road work, workers should walk the work area or intended travelway when puddles or snow may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces.

Project managers should arrange to have winches, come-alongs, or other mechanical assistance available when vehicles are used in areas where there is increased risk of getting stuck. Cable or rope and mechanical equipment used for pulling stuck vehicles must be designed for the purpose, of sufficient capacity for the load, and be inspected regularly and before use to ensure safety. **Manually pushing stuck vehicles is to be avoided.**

Prevention methods are required when work is performed in wet conditions or when conditions result in sweating, causing the feet to become and remain wet. Proper hygiene is critical. Workers must dry their feet and change socks regularly to avoid conditions associated with wet feet. Use of foot talc or powder can additionally assist in prevention of this type of condition.

Cold, Snow, and Ice

Cold weather affects vehicle operation by increasing difficulty in starting and braking. Ice, frost, and snow can accumulate on windows and reduce vision. Cold, wet weather can cause icing of roadways,

driveways, parking areas, general work places, ladders, stairs, and platforms. Ice is not always as obvious to see as snow or rain, and requires special attention, especially when driving or walking.

Snow and ice increase the risk of accidents such as slipping when walking, climbing steps and ladders, or working at elevation, and the risk of accidents when driving vehicles or operating heavy equipment. Heavy snow and ice storms may cause electric lines to sag or break, and the use of electrical equipment in snow increases the risk of electric shock. Snow can hide potholes and mud, which can result in vehicles getting stuck or persons falling when stepping into hidden holes. Snow also may cover water, drums or other containers, sharp metal objects, debris, or other objects that can cause falls or punctures.

Preventive and Protective Measures

WESTON personnel are cautioned against operating motor vehicles such as cars or trucks on ice under any circumstances. If traveling in icy conditions, WESTON personnel should follow all public service advisories that curtail driving activities.

Personnel performing activities that require working over ice should be aware of minimal ice thickness safety guidelines as follows:

- 4-inch minimum: activities such as walking or skating.
- 6-inch minimum: activities such as snowmobiling or the use of equipment with the same weight and cross-sectional area as a snowmobile.

Personnel should always be aware that these measurement guidelines are under ideal conditions and that snow cover, conditions on rivers, ponds, or lakes with active currents, and other environmental factors impact the safety of working on ice. Clear ice typically is the strongest, while ice that appears cloudy or honeycombed (contains entrained air) is not as structurally strong. Measurements made by drilling or cutting through the ice should be made every few feet to verify safe conditions. Provisions for rescue (e.g., ladders or long poles and effective communications) must be available at the work site.

Lightning

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments.

Lightning is the most dangerous and frequently encountered weather hazard people experience each year. Lightning affects all regions. **Florida, Michigan, Pennsylvania, North Carolina, New York, Ohio, Texas, Tennessee, Georgia, and Colorado** have the most lightning deaths and injuries.

Preventive and Protective Measures

Prior to working in areas or beginning projects when or where there is an increased potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes. Recommendations include:

- Check with client management to determine if there are any patterns or noted conditions that can help predict lightning or if there are structures that are prone to lightning strikes. Arrange for

client notification when there is increased potential for lightning activities. Ensure that clients include WESTON workers in lightning contingency plans.

- Monitor weather reports.
- Note weather changes and conditions that produce lightning.
- Stop work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.
- Ensure all personnel are provided with safe areas of refuge. Prevent personnel from standing in open areas, under lone trees, or under drill rigs.
- Observe the “30-30” Rule. If you see lightning and thunder is heard within 30 seconds (approximately 6 miles), seek shelter. If you hear thunder, but did not see the lightning, you can assume that lightning is within 6 miles and you should seek shelter. Remain in the sheltered location for 30 minutes following the last lightning strike.
- Use a hand held static potential meter (lightning detection device) to monitor the potential difference between a cloud and the ground. When the measured potential is greater than 2 kV/m, there is a potential for a lightning strike – seek shelter.

High Wind and Tornado Safety

High Winds

Many construction workers have died due to wind-related accidents and injuries. A ladder that seems secure under normal circumstances can become unstable during windy conditions and cause you to fall. Scaffolding that is improperly secured can rip free during strong winds and kill bystanders. The risk of injury for construction workers increases during strong winds. Keep in mind that changing weather conditions can affect your daily work tasks, and make sure you have a game plan to prevent proper damage and personal injury.

Stay Informed: With today’s modern technology available at the touch of a button, you should keep up to date with the latest local weather reports. Visit weatherbug.com or weather.gov to stay informed in case of wind warnings, watches, and advisories. Larger projects may have their own weather station on site to provide instant weather data. Use daily hazard assessments to determine if working conditions have changed or will change throughout the day.

Be Prepared: When you know the weather will be windy, secure loose building materials, scaffolding and fencing that could be picked up or torn loose by strong winds and thrown onto surrounding streets, structures, vehicles, or bystanders.

Know the Limits of Your Equipment: When operating any equipment, take time to read the operator’s manual and become familiar with the wind specifications. Many crane manufacturers have high-wind guidelines to prevent you from operating a crane in unsafe weather. You should also check safety equipment such as fall protection to determine if it is adequate for windy conditions.

Know the Terminology

Severe Thunderstorm Watch

A Severe Thunderstorm Watch means that strong thunderstorms capable of producing winds of 58 mph or higher and/or hail 3/4 inches in diameter or larger are possible. If you are in the area of a Severe Thunderstorm Watch, you should be prepared to take shelter from thunderstorms. Severe Thunderstorm Watches are generally issued for 6-hour periods.

Severe Thunderstorm Warning

A Severe Thunderstorm Warning means that thunderstorms capable of strong winds and/or large hail are occurring or could form at any time. If you are in the area of a severe thunderstorm, you should take shelter indoors immediately, avoid windows, and be prepared for high winds and hail. Severe Thunderstorm Warnings are generally in effect for an hour or less.

High Wind Watch

A High Wind Watch is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are likely to develop in the next 24 to 48 hours. For summit areas, high wind watches are issued when sustained winds are expected to exceed 45 mph and/or frequently gust over 60 mph. If you are in an area for which a High Wind Watch has been issued you should secure loose objects outdoors that may blow about and avoid outdoor activity that exposes you to high winds.

High Wind Warning

A High Wind Warning is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are occurring or imminent. For summit areas, warnings are issued for winds exceeding 45 mph and/or frequently gusting over 60 mph. Wind warnings may issued up to 24 hours ahead of the onset of high winds and remain in effect for 6 to 12 hours. If you are in an area where a high wind warning is in effect you should avoid activities that expose you to high winds. Loose objects may be blown around. Tree limbs may break and fall. Power lines may be blown down.

Wind Advisory

A Wind Advisory is issued when sustained winds of 30 to 39 mph and/or frequent gusts to 50 mph or greater are occurring or imminent. Wind advisories may be in effect for 6 to 12 hours. If you are in an area where a wind advisory is in effect you should secure loose objects that may be blown about outdoors and limit activity that may expose you to high winds.

Work Safely: If you will be working on a windy day, you should be alert and protected. Wear eye protection to prevent dust and other particles from entering or striking your eyes. Keep your hard hat on at all times to prevent injuries from falling or flying objects. The likelihood of falls from heights is greatly increased by strong winds. Wear the necessary PPE to ensure your safety.

To avoid flying debris and to minimize damage during high winds:

- Shut down outdoor activities involving work at elevation on ladders, scaffolding, aerial lifts, etc.; handling large tarps and plastic sheeting when wind speeds exceed 25 mph; including work with radioactive materials and highly toxic materials that could be dispersed by the winds.
- At 13 - 18 mph wind will raise dust. Follow the dust action level.

- Move mobile items stored outside to indoor storage.
- Secure any items that cannot be moved inside.
- Be careful opening exterior doors.
- Be cautious about downed power lines, tree limbs, and debris on roads.
- Be alert for animals who have escaped from farms and zoos.

Stay Away from Power Lines: High winds can cause tree limbs to fall on power lines resulting in electrocution hazards or loss of power. Your best bet is to keep your distance.

Tornados

What is a TORNADO?

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm or as a result of severe weather associated with hurricanes. A funnel cloud is formed as cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado results from high wind velocity and wind blown debris.

Tornado Safety

When a tornado approaches, you have only a brief amount of time to make life-or-death decisions. Advance planning and quick response are the keys to surviving a tornado.

Purchase a NOAA Weather Alert radio with an alert feature. When tuned to the proper frequency, these weather radios remain silent until a weather emergency occurs. Once they pick up the alarm tone, they will begin broadcasting emergency weather information so that citizens can protect themselves and their property. Some models of the NOAA weather radio incorporate the Specific Area Message Encoder technology, allowing users to target only those warnings that affect their immediate geographic area.

Conduct tornado drills. Designate an area to serve as your safe area, and practice having team members assemble there in response to a mock tornado warning.

Emergency Communications Plan. Develop an emergency communications plan in case team members are separated from one another when a tornado warning goes into effect. Designate an emergency coordinator. Instruct everyone to contact this coordinator in a weather emergency for instructions on what to do during the storm and where to reassemble after the emergency has passed. Design contingency plans to be consistent with client contingency plans. When possible use client warning and alerting systems and confirm that team members have access to shelters and know how to get to them.

Know the Difference between a Tornado Watch and a Tornado Warning

Tornado Watch: Issued by the National Weather Service when tornadoes are possible in your area. You should remain alert for approaching storms. Remind family members of where the safe areas are within your home, and carefully monitor radio or television reports for further developments.

Tornado Warning: Indicates that a tornado has been sighted in your area, or is indicated on weather radar. You should proceed to safe shelter immediately.

When A Tornado Warning Goes In Effect, Put Your Safety Plans In Action.

In Your Automobile: Motor vehicles are easily overturned by tornado winds. Leave your vehicle and seek shelter in a sturdy building. As a last resort, seek shelter in a ditch or culvert. Do not try to outrun or outmaneuver a tornado! Use the time to seek appropriate shelter outside your vehicle.

Office Buildings, Hotels, and Shopping Centers: Take shelter in an interior hallway on a lower floor. A closet, bathroom or other small room with short, stout walls will give some protection from collapse and flying debris. Otherwise, get under heavy furniture and stay away from windows. Many tornado deaths have occurred in large buildings due to the collapse of a roof or wide span wall. A corner area, away from a window, is safer than the middle of a wide span wall.

Out In Open Country: When severe weather approaches, seek inside shelter immediately. The chances of encountering falling trees, downed power lines and lightning are far greater than encountering a tornado itself. If a tornado approaches, lie flat in the nearest depression, such as a culvert or ditch, and cover your head with your arms.

BE ALERT TO CHANGING WEATHER CONDITIONS

HAVE AN EMERGENCY WEATHER PLAN IN PLACE

REHEARSE YOUR CONTINGENCY PLANS PERIODICALLY

KNOW WHERE TO GO WHEN A TORNADO THREATENS.

FLD 06 COLD STRESS

Three major factors that contribute to cold stress are cold temperatures, dampness, and wind velocity. Persons working outdoors in low temperatures, especially in wet or windy conditions, are subject to cold stress. Exposure to extreme cold for even a short time can cause severe injury to the surface of the body, or result in cooling of the body core temperature which, if unchecked, can be fatal. Site workers must learn to recognize and treat the various forms of cold stress.

RELATED FLDs

FLD 02 – Inclement Weather

FLD 17 – Diving

FLD 19 – Working Over or Near Water

FLD 25 – Working at Elevation/Fall Protection

GENERAL INFORMATION

Body heat is conserved through the constriction of surface blood vessels. This constriction reduces circulation at the skin layers and keeps blood nearer the body core. Loss of body heat can occur through:

1. Respiration – The process of breathing; inhaling and exhaling air. Heat is lost when breathing cold air into the lungs.
2. Evaporation – Heat loss from the body by vaporization of water from the skin surface.
3. Conduction – Direct transfer of body heat by contact with a cooler object. Conduction may occur when sitting on snow, touching cold equipment, and working in the rain. Body heat is lost rapidly when a person becomes wet. Most clothing loses approximately 90 percent of its insulating properties when wet. Additionally, water conducts heat 240 times faster than air; thus, the body cools suddenly when the layer of clothing that contacts the skin becomes wet.
4. Radiation – Heat radiated outward from the body to a cooler environment. The greatest amount of body heat is lost from uncovered surfaces of the body, especially the head, neck, and hands.
5. Convection – Heat transferred to cool air moving across the surface of the body. The body continually heats a thin layer of air next to the skin. Clothing retains this warm surface layer of air. If this warm air is removed by air currents (wind), the body will be cooled while attempting to rewarm the surface air. Wind chill is the chilling effect of moving air in combination with low temperature.

Other factors may contribute to cold stress, such as:

1. Medications, including antidepressants, sedatives, tranquilizers and some heart medications may affect the body's ability to thermo-regulate.
2. Dehydration, or the loss of body fluids, occurs in a cold environment and may increase the susceptibility of workers to cold injury due to a significant change in blood flow to the extremities.
3. Heavy work typically causes sweating that will result in wet clothing.

4. A worker's predisposing health condition such as cardiovascular disease, diabetes, and hypertension.
5. Older people are not able to generate heat as quickly, thus may be at more risk than younger adults.

When the body is unable to warm itself, serious cold-related illness and injuries may occur, including permanent tissue damage and possible death.

RECOGNITION AND RISK ASSESSMENT

In the planning stages of a project, the potential for cold-related hazards must be considered in the site-specific Health and Safety Plan (HASP) and during risk assessment. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

Low Temperature + Wind Speed + Wetness = Injuries and Illness

The Cold Stress Equation (OSHA Card-3156) is a quick-reference tool provided on the Weston Portal.

Frostbite

Frostbite is the freezing of tissue and most commonly affects the toes, ears, fingers, and face. Frostbite occurs when an extremity loses heat faster than it can be replaced by the circulating blood. Frostbite may result from direct exposure to extreme cold or cool, high wind. Damp socks and shoes may contribute to frostbite of the toes.

Signs and symptoms of frostbite include:

- Cold, tingling, aching, or stinging feeling followed by numbness
- Skin color is red, purple, white, or very pale and is cold to the touch
- Blisters may be present (in severe cases)

Treatment for frostbite:

- Call for emergency medical assistance.
- Move the victim indoors and/or away from additional exposure to cold, wet, and wind.
- Wrap the affected area in a soft, clean cloth (sterile, if available).
- Give a warm drink (water or juices, not coffee, tea or alcohol). Do not allow the victim to smoke.
- Do not rub the frostbitten part (this may cause gangrene).
- Do not use ice, snow, gasoline or anything cold on the frostbitten area.
- Do not use heat lamps or hot water bottles to rewarm the frostbitten area.
- Do not place the frostbitten area near a hot stove.
- Do not break blisters.
- After rewarming, elevate the area and protect it from further injury.

Hypothermia

Hypothermia means "low heat" and is a potentially serious condition. Systemic hypothermia occurs when body heat loss exceeds body heat gain and the body core temperature falls below the normal 98.6°F. While some hypothermia cases are caused by extremely cold temperatures, most cases develop in air

temperatures between 30° and 50°F, especially when compounded with water immersion and/or windy conditions.

The victim of hypothermia may not know, or refuse to admit, that he or she is experiencing hypothermia. All personnel must be observant for these signs for themselves and for other team members. Hypothermia can include one or more of the following symptoms.

- Cool bluish skin
- Uncontrollable shivering
- Vague, slow, slurred speech
- Irritable, irrational, or confused behavior
- Memory lapses
- Clumsy movements, fumbling hands
- Fatigue or drowsiness

Below the critical body core temperature of 95°F, the body cannot produce enough heat by itself to recover. At this point, emergency measures must be taken to reverse the drop in core temperature. The victim may slip into unconsciousness and can die in less than 2 hours after the first signs of hypothermia are detected. Treatment and medical assistance are critical.

Treatment for hypothermia:

- Call for emergency medical assistance.
- Do not leave the victim alone.
- Prevent further heat loss by moving the person to a warmer location out of the wind, wet, and cold.
- Remove cold, wet clothing and replace with warm dry clothing or wrap the victim in blankets.
- If the victim is conscious, provide warm liquids, candy, or sweetened foods. Carbohydrates are the food most quickly transformed into heat and energy. Do not give the victim alcohol or caffeine.
- Have the person move their arms and legs to create muscle heat. If they are unable to move, place warm bottles or hot packs in the arm pits, groin, neck, and head. Do not rub the arms and legs or place the person in warm water.

Prevention and Protection

The following general guidelines are recommended for preventing or minimizing cold stress:

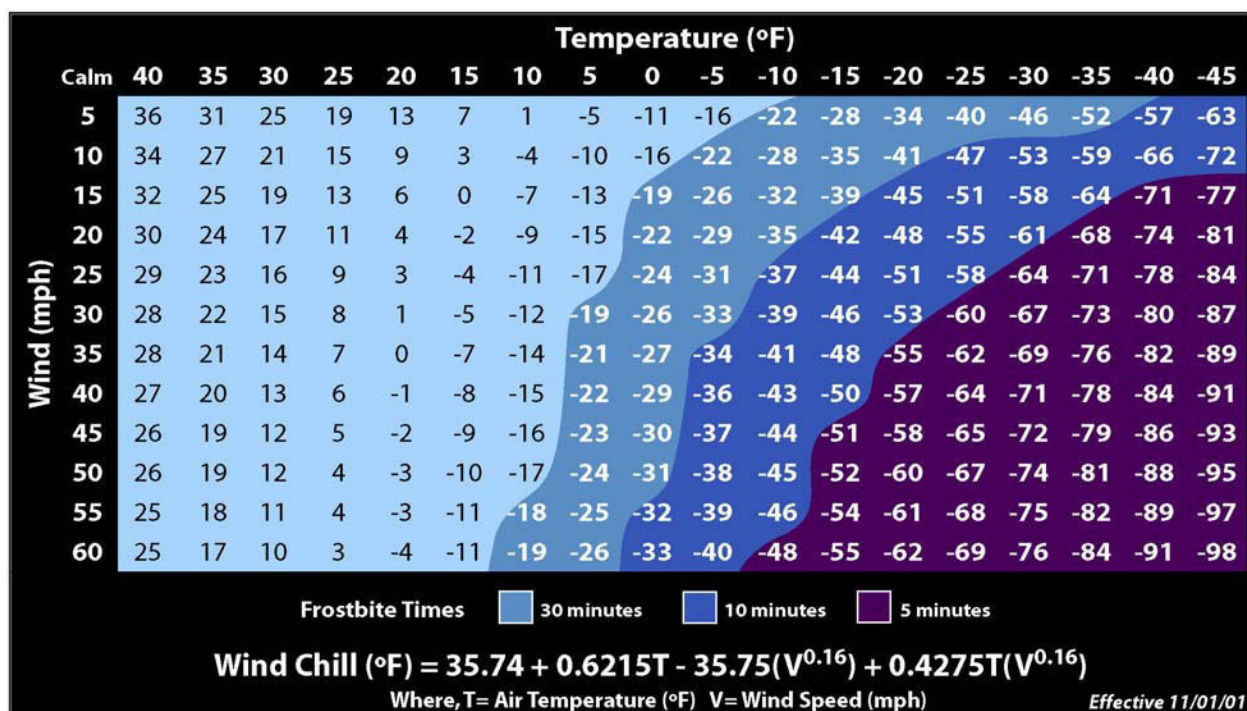
- Wear loose, layered clothing, masks, woolen scarves, and hats. Wear liners under hard hats
- Protect hands with gloves or mittens.
- Never touch cold metal with bare hands.
- Wear waterproof, slip-resistant, insulated boots
- Use chemical foot and hand warmers (commercially available) inside boots and gloves.
- In extreme cold, cover the mouth and nose with wool or fur to “pre-warm” the air you breathe.
- If wearing a face protector, remove it periodically to check for frostbite.

- Ensure that clothing remains secure around the body, especially at the neck and waist.
- If required to wear chemical protective clothing, remember that it generally does not afford protection against cold stress. In many instances, chemical protective clothing increases susceptibility. Dress carefully if both chemical protection and thermal insulation are required.
- Remove outer layers to avoid overheating and soaking clothing with perspiration; replace layers to avoid becoming chilled.
- Keep clothes dry by wearing water-resistant and wind-resistant clothing and outerwear.
- Wear clothing that will “breathe” or allow water vapor to escape.
- Eat well-balanced meals, ensure adequate intake of liquids and avoid alcoholic beverages. Drink warm sweet beverages and soups. Limit the intake of caffeinated drinks due to the diuretic and circulatory effects.
- Utilize available warm shelters and implement work-rest schedules.
- If warm shelters are not available, use cars/vehicles as shelter from the cold. (Ensure that tailpipes are not covered by heavy snowfall).
- Use radiant heaters to provide warmth (if using propane heaters ensure adequate ventilation to avoid carbon monoxide poisoning).
- Monitor yourself and others for changes in physical and mental condition.
- Use the buddy system or supervision to ensure constant protective observation.
- If heavy work must be done, resulting in sweating/wet clothing, take rest periods in heated shelters and change into dry clothing as necessary.
- New employees should not work full-time in the cold during the first days of employment until they become accustomed to the working conditions and the use of required protective clothing.
- Include the weight and bulkiness of clothing in estimating the required work performance and weights to be lifted by the worker.
- Arrange the work in such a way that sitting or standing still for long periods is minimized.
- Perform work protected from drafts to the greatest extent possible. If possible, shield the work area from wind.
- Instruct workers in safety and health procedures. The training program should include, as a minimum, instruction in:
 - Signs and symptoms of frostbite, impending hypothermia, or excessive cooling of the body
 - Proper use of clothing
 - Proper eating and drinking habits
 - Safe work practices
 - Proper rewarming procedures and appropriate first aid treatment
- Tables 1 and 2 should be consulted to adjust working schedules for wind chill conditions based on equivalent chill temperature (ECT). These tables are guidelines only; ambient temperatures and wind conditions should be monitored frequently and work schedules adjusted as required. If workers show signs or symptoms of cold stress, the work schedule must be adjusted, as required.

Work/Warming Regimen

Work should be performed in the warmest part of the day. If work is performed continuously in the cold or winter conditions or where rain or cool winds are expected, provide heated warming shelters, tents, cabins, or break rooms nearby. Encourage workers to use the shelter at regular intervals depending on the severity of the cold exposure. Table 2, Cold Work/Warmup Schedule for 4-Hour Shifts, provides guidance for working in severe cold weather. The onset of heavy shivering, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. Pain, numbness, or tingling in the extremities are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation, or the worker should change into dry clothing. Never return to work in wet clothing.

Table 1. Wind Chill Chart



NWS/NOAA

Table 2. Cold Work/Warmup Schedule for 4-Hour Shifts

EQUIVALENT CHILL TEMPERATURE	MAXIMUM WORK PERIOD	NO. OF BREAKS
≥-24°F	Normal	1
-25° to -30°F	75 minutes	2
-31° to -35°F	55 minutes	3
-36° to -40°F	40 minutes	4
-41° to -45°F	30 minutes	5
≤-46°F	Stop work	Stop work

FLD 10 MANUAL LIFTING AND HANDLING OF HEAVY OBJECTS

Improper lifting can result in cuts, pinches, crushing, and serious injury to back, abdomen, arm and leg muscles, and joints. Even relatively light objects, lifted improperly, can contribute to injury. Muscle and joint injuries occur when objects to be lifted are too heavy or awkward, are lifted improperly, or in areas where access is restricted. Lifting tasks which are awkward and repetitive, even if involving only light objects, can lead to nerve and joint damage.

At the project level, the need for manual lifting or handling of heavy objects must be identified as a physical hazard in the planning stages of a project Health and Safety Plan (HASP).

MANUAL LIFTING

Plan any manual lifting task noting the following:

Contact hazards. Check each object before lifting for presence of splinters, splinters, sharp edges or parts, cracks and loose joints, which can result in cuts. Signs of biological hazards, and chemical or radioactive material contamination.

- **Weight of object.** Unless involved in weight training, recommended safe lifting weights for an average man or woman are 50 and 35 pounds, respectively.
- **Size and shape of object.** Large and oddly shaped objects are more difficult to lift, even within safe weight limits, due to imbalanced center of gravity.
- **Area in which lifting is to be done.** Heavy objects can pinch or crush fingers, toes, arms, and legs between the object and nearby objects (e.g., walls, tables, counters, or railings). Check for pinch points such as other objects close by and ensure there is room for safe lifting.
- **Conditions under which lifting is to be accomplished.** Check for wet or slippery surfaces. Consider level of protection to be used. Level B or A protection may add up to 40 lbs. To be lifted, as well as restricting range of motion and adding to area restriction by increasing bulk.

Route to be traveled, if lifting includes carrying. Check walking and working surfaces for slip and trip hazards, note ramps, changes in level of elevation, and ladders or stairways that need to be negotiated.

Manual Lifting - Prevention and Protection

- Before lifting, identify the potential for contact hazards on objects to be lifted. Check each object before lifting, remove any noted hazards as feasible, and wear gloves (cotton, at a minimum, or leather, kevlar, or chemical resistant material, depending on the nature of the hazard).
- Avoid contact with, or cover cracks or loose joints to reduce hazards of pinching.
- Workers must know their lifting limitations, plan before lifting, keep themselves in good physical condition, and get help if uncertain that they can lift safely. Managers must plan and allow for safe lifting.
- When lifting an object from the floor:
 - Determine that the object is within the safe weight limit.
 - Check for contact hazards.
 - Walk the intended route of travel to identify and remove slip and fall hazards.
 - Identify changes in elevation, steps, ramps, stairs and ladders that must be negotiated.

- To lift square or rectangular objects:
 - Avoid reaching as you lift.
 - Set feet firmly, placing one foot alongside the load and the other slightly behind the load.
 - Keep objects close to the body.
 - Squat in front of the load.
 - Grasp one of the top corners away from the body and the opposite bottom corner closest to the body.
 - Tilt the object slightly away from the body, tilt forward at the hips, keep the back straight and tuck in the chin.
 - Straighten the legs, keeping the spine straight, pull the object into the body and stand up slowly and evenly without jerking or twisting.

If turning or change of direction is required, turn with feet without twisting the torso and step in the direction of travel

To set an object down, reverse the sequence, being sure not to trap the bottom hand between the object and the surface on which the object is set.

Workers must be trained and have the opportunity to use the above steps with lighter objects before performing heavy lifting. **For odd-shaped objects, the only modification needed should be hand-hold position.** When two or more persons are lifting, have a plan and a set of signals so lifting occurs simultaneously.

Do not carry objects in a manner which obstructs vision in the line of travel.

Carry objects so one hand is free to hold the handrail on stairs and that there is an unobstructed view of footing. Carry objects in a manner to permit use of both hands while climbing a ladder.

MANUAL HANDLING OF HEAVY OBJECTS

Manual handling of heavy objects, even when not lifting, can pose the same hazards as lifting including cuts, pinches, bruises, crushing, muscle and joint strain, and contact with hazardous materials and biological hazards.

Drums and other containers which must be maneuvered for access to information or sampling locations, that are inaccessible to mechanical handling equipment, require manual handling and special precautions. When handling of heavy objects does not involve lifting, workers can handle heavier objects safely, even those weighing several hundred pounds, if proper techniques are used. In many instances, the procedures involve balancing and taking advantage of the shape of the object.

Manual Handling - Prevention and Protection

Prior to performing manual handling, it must be determined that it can be done safely and that mechanical assistance is infeasible. Mechanical equipment or assistance such as dollies, carts, come-alongs or rollers are to be used whenever possible. Mechanical assistance must be of proper size, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on wrists. Objects to be moved must be secured to prevent falling and properly balanced to prevent tipping.

The minimum protection for manual handling is heavy cotton or leather gloves, safety boots, and coveralls. Metatarsal guards, chemical protective clothing, and metal mesh or kevlar gloves must be used as risk increases of heavy items falling, hazardous materials contact and sharp edges, splinters or slivers.

Workers must be aware of and work within their weight-handling capabilities.

Objects to be manually handled must be checked for contact hazards before handling, and to ensure handling will not trap hands, arms, legs, or feet between the object and other objects, walls, or railings.

Properly trained personnel may roll heavy objects with a round base such as 55-gallon drums or compressed gas cylinders, if rolling will not damage the structural integrity. Rolling must be controlled by chutes, tag-lines, or other means of limiting acceleration. Use of the legs for pushing and tag-line control of rolled objects must be stressed.

Only properly trained personnel may move cylindrical objects which must remain upright by hand. Cylindrical objects, such as drums that must remain upright, are handled manually by slightly tilting the object, using the legs for control, and balancing the object on the bottom edge. The handler then walks beside the object, with the object tilted toward the body, positioning the hands on the top edge away from the body and moving so they do not cross, thus maintaining balance and a steady controlled forward motion.

Prior to moving cylindrical objects in this way, the route of travel must be walked to identify any changes of elevation, pot holes, or other obstructions that could cause the object to snag, tip, or get out of control.

Flat, square, or rectangular objects are most easily handled using make-shift rollers or skids to break the friction with the resting surface and pushing, using the legs.

SITE SECURITY GUIDELINES FOR FIELD LOCATIONS

PROCEDURE

When WESTON's responsibilities include site control or security as in WESTON Office locations, one aspect of the Site Health and Safety Plans and Business Continuity Plan Emergency Action Plans to be addressed is security, or maintaining control of access to the site. Contingency plans are required to deal with unauthorized entry. Inquisitive and/or hostile persons may interfere with the site activities or work effort, jeopardizing their safety, as well as the safety of the field team.

Recognition and Risk Assessment

In the planning stages of a project and safety plan, the potential for security problems must be considered as physical hazards in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely security problems that may be encountered. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

Entry to a site by unauthorized persons presents risks to the persons entering and to WESTON personnel who may have to interact with such individuals. In many cases, the unauthorized entry is accidental or unintentional; however, contingency plans must also include procedures for instances when unauthorized entry is deliberate or for purposes which could pose a threat to site personnel.

During the assessment of risk for each site, security problems must be identified. The contingency plan should identify ways to prevent and respond to security problems.

Security problems may arise from the site neighborhood due to:

- Socio-economic factors
- Client/neighbor relations
- Client/labor relations
- Poor lighting
- Remoteness and size of site
- Value of equipment and materials
- Sampling equipment tampering

Prevention and Protection Program

Prevention programs are an integral portion of a Security Plan for Business Continuity and Emergency Action Plans or Contingency Plans for Site Health and Safety Plans. An effective preventative measure is to inform all interested parties of the site activities. An attempt should be made to notify state and local police, the fire department, and any local/state government officials of the project's purpose and scope.

This will allow those authorities to answer questions posed to them by local residents and the media by preparing statements on the project's purpose or by informing the public where to call for further information. This will alleviate the problem of work stoppage due to field personnel answering questions.

One must ensure that the client understands and approves of any information released. In most cases, the liaison should be between the client and the public.

The Security Contingency Plan must:

- Identify the person responsible for implementing the Contingency Plan
- State as the first priority the safety of WESTON personnel
- Be designed to minimize the potential for confrontation and to obtain security assistance as quickly as possible
- Assign the enforcement of security functions to properly trained and authorized or bonded agencies
- Establish a communication procedure for obtaining assistance
- Be communicated to site personnel

Security Problem Prevention measures include:

- Community relations programs
- Visible security precautions (e.g., fences, "keep out" signs)
- Locking doors that are unattended during working hours and all doors during non-working hours
- Carefully defined rules/requirements for authorizing site access
- Clearly delineated access points and barriers around work area
- Vigilance by all site personnel
- Adequate lighting
- Working in pairs or teams in sensitive areas
- Locking and storing equipment securely
- Using discretion in discussions and conversations when off-site
- Working to avoid confrontation

In short, security prevention includes not advertising activities or inviting intrusion. Telephone numbers and instructions for obtaining security assistance must be clearly posted onsite.

Personnel onsite must always have access to communications. These communications may be to additional onsite personnel or, in certain situations, communications by team members to outside response agencies may be necessary.

FLD 34 UNDERGROUND UTILITIES

REFERENCES

29 CFR 1926.651, *Specific Excavation Requirements*
ANSI Standard Z 535.1, *American National Standard for Safety Color Code*

RELATED FLDs

FLD 42 – Lockout/Tagout

This Field Operation Procedure (FLD) provides requirements for identification, location, and avoidance of underground utilities, appurtenances, and structures during intrusive activities. These requirements are applicable to all Weston Solutions, Inc. (WESTON) operations. The procedures address the requirements and recommendations for identifying and locating, working around, and encountering or contacting underground utilities. The FLD also addresses actions to be taken in response to encountering or contacting underground utilities.

DEFINITIONS

Aggressive Methods

The use of mechanized equipment such as (but not limited to) excavators, backhoes, drill rigs, directional drilling, Geoprobe operations (including all direct push techniques), or road saws.

Buffer Zone

As defined in this procedure, the area around a utility where only non-aggressive excavation methods may be utilized, unless specific conditions are met.

The definition cited above, and the excavation requirements and restrictions associated with it, will vary depending on the particular state regulations. WESTON requires the imposition of a **three-foot** Buffer Zone on all sides of the utility as measured from the outside edges of the utility, both horizontally and vertically. State and/or local buffer zone requirements must be verified by consulting the applicable state regulations in the event buffer zones greater than three feet are required.

The term “Buffer Zone” may be referred to as the “Tolerance Zone”, “Safety Zone”, or “Approximate Location of Underground Utilities” in some jurisdictions.

Competent Person

A Competent Person has the ability to recognize hazards associated with underground utilities and the authority to stop or direct operations to ensure the safety of personnel and conformance with this procedure. The Competent Person has an understanding of this procedure, and the “One-Call” system requirements for the jurisdiction where excavation is occurring. The Competent Person must be capable of notifying One-Call agencies and maintaining and tracking One-Call Locate Numbers. Additionally, they must have knowledge of methods and work practices for excavation work and the identification, avoidance, and protection of underground utilities.

The designation of a Competent Person will be made by the Site Manager (SM) or Project Manager (PM) and documented in the site-specific Health and Safety Plan (HASP) or attachment to the HASP. Each WESTON Competent Person is required to successfully complete WESTON’s internal training program on the use and application of this FLD and possess appropriate and relevant field experience.

The names of Subcontractor Competent Persons will be documented in the Site-Specific *Subcontractor Acknowledgment: Supervisor Personnel, Competence of Personnel, and Task Understanding* form. Subcontractor Competent Persons will be expected to follow this FLD or their company's procedures, whichever is more restrictive.

Damage

Damage may be considered as any undesired impact or unanticipated removal of support from an underground utility as a result of excavation or demolition. Damage may be as simple as minor contact (by any means) resulting in displacement of protective coating. The utility owner must be contacted regarding any damage or question of damage.

De-Energize

As applicable to a utility, to physically eliminate and/or prevent the presence, transmission, flow, or release of energy or materials which may cause harm to personnel or property.

Excavation (Intrusive Activity)

An operation using mechanized equipment for the purpose of movement or removal of earth, rock, or the materials in the ground, including but not limited to: digging, blasting, augering, test boring, drilling, pile driving, directional drilling, grading, plowing-in, hammering (including hammer-drill soil gas sampling tube installation), pulling-in, jacking-in, trenching, tunneling, structural demolition, milling, scraping, tree and root removal (grubbing), and fence or sign post installation. Note that in some States or jurisdictions, excavation may include hand augering or use of other hand tools.

Jurisdiction

The Authority having legal jurisdiction for establishing and/or enforcing regulations and requirements for notification of excavation activities and associated identification and marking of underground utilities. In the United States, the States have jurisdiction, and most consider the regulations applicable when excavation is to be performed in any location, including any public or private way, any company right-of-way or easement, or any public or privately owned land or way. Note: One caveat to remember – Jurisdiction may flow to the “owner” on private or government-owned property because the State One-Call Agencies may not clear utilities on such facilities.

Note that easement boundaries may require differing methods for compliance assurance. Railroads and certain above ground utilities have easements that require specific procedures for excavation (including shoring and shielding of both the utility as well as for the track and/or poles). In these cases it may be required that an inspector or representative of the railroad or utility is present at all phases of the activity.

Locate

To indicate the existence of a utility by establishing a mark through the use of flags, pins, stakes, paint, or some other customary manner, that *approximately* determines the location of a line or facility.

Locate Request

A communication between an entity performing intrusive activities and a utility marking agency (One-Call, etc).

Non-Aggressive Methods

Non-Aggressive methods involve the use of manual methods such as hand digging with shovels or by potholing or daylighting methods.

Observer

The person assigned to visually monitor and, as needed, signal the operator during mechanized intrusive activity when the activity is occurring within three feet of the outside edge of the buffer zone. The observer remains in close communication with the equipment operator(s) and will stop the activity if needed.

One-Call Agency

An entity that administers a system through which a person can notify owners/operators of underground lines or utilities of the intent to perform intrusive activities in proposed public areas. **It is important to note that not all underground utility owners may be required to join the One-Call system. Additionally, some underground utility owners may not comply with State registration requirements.** The SM or Competent Person is responsible to determine additional utilities that may need to be contacted individually.

Positive Response

Verification prior to the intrusive activity, to ensure that all contacted (typically via the One-Call Agency) owner/operators have located and marked the underground utilities. The SM or Competent Person is responsible to determine/verify ownership of the property where the intrusive activity will occur, including any easements.

Potholing or Daylighting

The practice of exposing an underground facility by safe, *non-aggressive* excavation methods in order to determine the precise horizontal and vertical position and orientation of underground lines or utilities. potholing or daylighting are terms used to describe the excavating of buried facilities using an air or water “knife” coupled with vacuum excavation that exposes underground utilizes to the “daylight” – a positive and safe means of identification and confirmation of exact utility location.

Target Rich Environment

Areas where multiple utilities are known or suspected of being located, areas where utility locations are in question and/or difficult to obtain information on, or areas with known or suspect high-risk utilities. **Note: Military Bases (active or inactive) are to be considered “Target Rich Environments”.**

Underground Utility

An underground or submerged conductor, pipe, or structure used in transporting or providing electric, communications service, gas, oil or oil product, sewage, storm drainage, water, or other service and appurtenances thereto. As used in this procedure, utility includes all underground appurtenances and structures.

The following are examples of the types of underground utilities that may be present in a given location:

- Natural gas pipelines
- Electric cables

- Water pipelines
- Fiber optic telecommunications lines
- Telephone cable lines
- Steam pipelines
- Gasoline, oil, or other fuels
- Sewer pipelines
- Vents for sewer and gasoline/diesel fueling systems
- Underground Storage Tanks (USTs)
- Abandoned underground structures containing hazardous materials, hazardous wastes, and radioactive materials

Underground Utility Owner

Any person, utility, municipality, authority, political subdivision or other person or entity who owns, operates, or controls the operation of an underground line/facility.

White Lining

The practice whereby the person (in this case WESTON or a Subcontractor) who intends to perform intrusive activities, pre-marks the site with an outline of the area where intrusive activities will occur. This involves the use of white paint, flags, stakes, or a combination thereof to mark the extent of where work is to be performed. The marking may vary depending on what intrusive activities are to be conducted. For example, for general excavation, an areal outline of the excavation shall be marked, while for drilling, the individual boreholes shall be marked. Studies have shown that pre-marking is a practice that does prevent utility contact incidents. Check State or local regulatory requirements to ensure compliance.

RESPONSIBILITIES

Competent Person

The Competent Person shall be responsible for:

- Obtaining a copy of, and understanding the applicable regulations for the state of jurisdiction where the excavation activities are to be performed.
- Contacting the appropriate One-Call Agency or private locating service, as applicable.
- Recording One-Call locate numbers.
- If necessary, renewing One-Call locate numbers before expiration.
- Ensuring that white-lining of the area to be excavated is performed; if another equal or better protective measure is necessary because of the nature of the work, state/local regulation, or client requirements, the HASP should be amended to reflect the change.
- Ensuring that a “positive response” has been received from every utility owner/operator identified by the One-Call Agency (and any non-member utility as necessary) and that they have located their underground utilities and have appropriately marked any potential conflicts with the areas of planned intrusive activities prior to the start of intrusive work.

- Ensuring that appropriate means for supporting and protecting any exposed utility have been discussed with the utility owner and such means are available on-site.
- Ensuring that above-ground utilities and other appurtenances will not create a problem, or be impacted by WESTON activities. In all cases provisions for protection of any utility, structure, or appurtenance must be made.
- Ensuring that provisions for emergency actions and emergency shut-off/mitigation of utilities have been discussed with utility owners and field personnel.
- Ensuring that pictures are taken before, during, and after intrusive activities and placing such pictures in the project file. Pictures should provide visual documentation of actual site conditions, including but not limited to exposed utilities, methods used for bracing utilities and markings placed on the surface by utility locating services. Consideration should also include placing of a known object in the picture field to provide a “scale” for size/distance comparison.
- Completion and maintenance of the Underground Utilities Locating and Marking Checklist (Attachment A) and the Underground Utilities Management Checklist (Attachment B).
- Reviewing applicable Activity Hazard Analyses (AHAs) with all project members before work begins.
- Conducting training on communication protocols to be used by the excavation observer and equipment operator.
- Ensuring implementation of appropriate work practices during intrusive activities (including maintaining the prescribed buffer zone for use of aggressive methods).
- Conducting daily or more frequent (due to changes in conditions) inspections of the excavation area to make sure that all markings are intact.
- Providing the Field Safety Officer (FSO) with all required documentation on a daily basis.

Observer

Whenever intrusive operations with mechanized equipment are being conducted *within three feet of the outside edge of the buffer zone*, horizontally and vertically, an observer must be assigned to monitor the activities. The observer is responsible for:

- Maintaining a safe vantage point relative to digging machinery, excavation edge, and proximity to the hazard posed by the utility.
- Observing the operation to ensure that the operator stops operations if utilities are observed.
- Reviewing hand signals and other forms of communication with the operator. Note: hand signals should be as those identified under ANSI, OSHA, or the Corps of Engineers for Crane Hand Signals, or another, equally effective and understood system.
- Properly signaling the operator.
- Stopping the operation immediately if the observer’s attention must be diverted even momentarily.
- Stopping the operation immediately if a hand signal or other directive is not followed. Operations will not resume until the observer and operator mutually agree that the reason(s) for not complying with the directive(s) are/is identified and fully corrected.
- Maintaining required records, such as logbook entries, or other, as requested by line management.

Line Management

The PM or SM shall be responsible for:

- Establishing the site culture with the assistance of the FSO that ensures compliance with this FLD, as well as providing the leadership to “do the right thing” whenever unanticipated circumstances arise.
- Providing the necessary resources, including sufficient schedule for compliance with this FLD.
- Designating a Competent Person or ensuring that a subcontractor Competent Person is designated, prior to the start of work.
- Discussing intrusive activity liability with the Client prior to the start of work. Best practices for identification of underground utilities must be included with the proposal and/or HASP, as well as WESTON’s requirement for Client sign-off (if the Client is the property owner or if the Client selects the drilling/intrusive action location) when identifying specific work locations for intrusive activities. In cases where the client, such as EPA, will or cannot sign off on liability or provide indemnification, discussions with the appropriate client representatives on intrusive activities will be documented in the project file.

Note: In any ‘target-rich’ work environment, best practices must include the requirement for potholing/daylighting or careful hand-digging – whenever possible (at least 5 feet below grade) – since these are recognized processes for visually verifying the exact location of underground utilities while minimizing the potential for utility damage.

- **For excavations using aggressive methods in target-rich environments**, consideration should be given for establishing an agreement with an Emergency Response Contractor and/or the specific utility owner prior to the start of intrusive activities. This agreement should include specific emergency notification procedures for each utility identified to ensure that timely response can be accomplished in the event of a utility strike.
- Determining/verifying ownership of the property where the intrusive activity will occur, including any easements.
- Contacting all utilities not notified directly by the utility notification center, including those known to local personnel and the property owner.
- Obtaining Profit Center Manager approval for any deviations from this FLD, including best practices, or for addressing any set of circumstances not specifically addressed in this FLD that may place WESTON or its employees at risk.

Environmental, Health, and Safety Personnel

The FSO shall be responsible for:

- Providing oversight on the implementation of the requirements contained in this FLD.
- Consulting with the PM, SM, Competent Person, and the appropriate Division Environmental, Health, and Safety Manager (DEHSM) (or Corporate EHS) on underground utility issues.
- Acting as the Competent Person or Observer as necessary and qualified.

Procedure

The following sections provide the requirements and recommendations, which are intended to prevent injury to personnel, damage to infrastructure, and associated indirect effects associated with encountering

or contacting underground utilities during intrusive work. Underground utilities present multiple potential hazards that must be recognized before and during work which occurs near them, therefore, this procedure is divided into sections addressing underground utility identification and location, working around or near underground utilities, and actions to be taken in the event that underground utilities are encountered or contacted. Hazards that may be presented by underground utilities include explosion and fire, electrocution, toxic exposures, pathogens, and drowning.

Identifying and Locating Underground Utilities

The potential for underground utilities or other subsurface feature (e.g., subsurface mines) must be evaluated as early as possible in the planning phase for any project which involves intrusive activities. The following sections describe various methods for identifying and locating utilities on a site. The *Underground Utilities Locating and Marking Checklist* (Attachment A) and the *Underground Utilities Management Checklist* (Attachment B) must be completed before any activities meeting the definition of excavation are conducted. Attachment A is intended to be used as a guide during the process of locating and marking utilities in the area to be excavated. Attachment B is intended to be used as a guide in the overall process of underground utilities management during the course of the project.

Note: Attachments A and B or their equivalents must be used to document compliance with this FLD and will be subject to audit.

Prior to excavation all underground utilities must be located and identified by at least two of the following:

- The Utility Owner
- The Property Owner
- A Private or Public Utility Locating Service
- Review of the most current utility drawing, maps or other available records by an approved WESTON Competent Person
- Use of utility locating technology by a WESTON Competent Person or subcontractor – this includes the use of potholing or daylighting in a “target-rich” work environment or whenever a full clearance (without restrictions) cannot be obtained from a utility locating service.

As an aid in determining the potential for or existence of utilities follow the criteria outlined in Attachment C (Utilities Research Options).

Pre-Planning and the Site HASP

The site-specific HASP developed for the project must:

- Identify the location and types of underground utilities that are believed to be present on the site.
- Reference this procedure (FLD 34), and describe how it will be implemented on the project.
- Contain an AHA in which the hazards associated with underground utilities are identified, as well as the measures used to control them.
- Contain any site or contract-specific requirements (e.g., Corps of Engineers, EM 385-1-1, Section 25) that may be applicable.
- Contain clear and concise procedures to be followed in the event that contact with underground utilities occurs.

- Address underground utilities and potential associated scenarios in the emergency response section of the HASP.








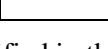
“One-Call” Locating and Marking Services

Every state has utility marking service programs that have various names such as “One-Call”, “Dig-Safe”, “Call-Before-You-Dig”, “Dig-Safely”, and many others. These services will identify the types and locations of any utility that may exist in an area to be excavated, as long as the property is in the public domain.

- The appropriate One-Call service for the jurisdiction where the project is located must be contacted prior to beginning excavation work. The One-Call Agency should be given as detailed a description of the property as possible; address, cross street, utility pole numbers, physical description, etc.
- Notification to the One-Call service shall allow sufficient lead-time for the Agency to mark the utilities before excavation begins. The lead times vary, but range from two to ten days, depending on the state of jurisdiction.
- In the event the State or Local One-Call service number is in question call "811" (the Federal Call before You Dig Number) for access to the appropriate locator service.
- A complete listing of One-Call agencies and telephone numbers for all states is available in the “*Call-Before-You-Dig Call Center Directory*”, which can be accessed on the Internet at the WebPage (<http://underspace.com/index.htm>) sponsored by “*Underground Focus*” magazine.
- Once notified, the One-Call Agency will provide the contractor with a unique “locate number” or “reference number”. This reference number must be kept in the project files by the Competent Person or designee. Additionally, the reference numbers have expiration dates, which may vary depending on the particular One-Call Agency. The valid period of the locate number and required renew notification date shall be requested from the One-Call Agency.
- On a project with multiple contractors, each contractor must request a separate locate number. Under no circumstances will any other contractor or entity be allowed to “work under our locate number”. Subcontractors to WESTON may excavate under the locate number secured by WESTON, provided that they are excavating within the area which was previously white-lined by WESTON and subsequently marked. **However, the One-Call Agency must be contacted and notified of this arrangement so that the subcontractor can be recorded as working under the existing locate number.** If a WESTON subcontractor will be excavating in an area not white-lined by WESTON, then the WESTON subcontractor must request a new locate. **Note: State and local requirements must be checked for local application of this procedure.**
- The area where work is to be performed shall be white-lined before the locating service goes to the site.
- It is good practice to arrange a pre-excavation meeting at the project site with the personnel performing the utility location and marking. This meeting will facilitate communications, coordinate the marking with actual excavation, and assure identification of high-priority utilities.
- The One-Call Agency should provide the identities of the utility owners that will be notified of the locate request. This information shall be recorded on the Underground Utilities Locating and Marking Checklist (Appendix A) and maintained in the project files. The contact person and phone number for each utility owner shall also be recorded. ***Note that all utility owners are not members of the One-Call system.*** This does not eliminate the need to contact a non-member owner if you have knowledge or suspect that excavation will impact their utility.

- The utility owners should provide a “positive response” relative to the locate request, which can consist of two types of action by the utility owner. The facility owner or operator is required to 1) mark its underground utilities with stakes, paint, or flags, or 2) notify the excavator that the utility owner/operator has no underground utilities in the area of the excavation.
- The positive responses shall be recorded on the Underground Utilities Locating and Marking Checklist (Attachment A) and crosschecked with the list of utility owners that the One-Call Agency stated they would notify. If it is discovered that a utility owner has not provided a positive response, then the One-Call Agency must be notified.
- Excavation shall not be conducted until positive responses have been received from all utility owners identified by the One-Call Agency as having underground utilities on the property.
- Before beginning excavation, the excavator must verify that the location marked was correct, and the distinct, color-coded markings of all utility owners are present.
- Examine the site to check for any visible signs of underground utilities that have not been located and marked such as pedestals, risers, meters, warning signs, manholes, pull boxes, valve boxes, patched asphalt or concrete pavement, areas of subsidence, fresh sod or grass, lack of grass or vegetation, and new trench lines.
- The markings placed by the utility owners should be documented by WESTON using a still, digital, or video camera, whenever practical and reasonable. The photo-documentation shall be maintained with the project files.
- The markings placed by the utility owners or marking services typically follow the American Public Works Association Uniform Color Code as described in ANSI Standard Z 535.1. This code follows:

American Public Works Association Uniform Color Code

Red		Electric Power Lines, Cables, Conduit
Orange		Communications, Telephone, Cable TV
Yellow		Gas, Oil, Steam, Petroleum or Gaseous Materials
Green		Sewers and Drains
Blue		Potable Water Systems
Purple		Reclaimed Water, Irrigation, Slurry Lines
Pink		Temporary Survey Markings
White		Proposed Excavation

Note: Unless otherwise specified in the utility clearance, such clearance will not be considered valid after 30 days from the date it was issued.

Private Utility Locating and Marking Services

- **One-Call agencies arrange for the identification and marking of underground utilities only on public property, up to the point of contact with private property.** In the event that activities are to be conducted on non-public properties, the presence, location, depth, and orientation of all underground utilities shall be ascertained through records review, including any site plot plans, utility layout plans, and as-built drawings available from the property owner, as well as through interviews with knowledgeable personnel associated with the property (See Attachment C). Additionally, for excavations using aggressive methods in target-rich

environments or other situations where utility locations are in question, the information gathered from these sources shall be verified by physical detection methods (non-aggressive), performance of a geophysical survey, or by procuring the services of a private utility locating and marking service. If any detection methods are to be self-performed, the requirements within this FLD must be followed. **A list of vendors providing this service can be found in the “Network of Underground Damage Prevention Professionals” which can be accessed on the Internet at the “Underspace” WebPage (<http://underspace.com/index.htm>).**

Self-Performance of Utility Locating and Marking

The techniques and instruments used to locate and characterize underground utilities can be extremely complicated and difficult to use effectively. Additionally, interpretation of the data generated by this instrumentation can be difficult. The utility marking services, as previously described are staffed by well-trained, experienced professionals who perform locating activities on a regular basis. For these reasons, it is most desirable that these professional services are used for utility location and marking on projects.

- In some instances on private property or in other areas not served by One-Call agencies (e.g., long-term projects where excavation is a primary task, and the presence of underground utilities is extensive) it may be prudent to self-perform locating and marking activities.
- If locating and marking is to be self-performed, all personnel using instrumentation will be trained on the use of the equipment that will be used, and the interpretation of the data.
- There are a variety of locating methods which may be utilized for self-performance of utility locating as categorized below:
 - Magnetic field-based locators or path tracers
 - Buried electronic marker systems (EMS)
 - Ground penetration radar-based buried –structure detectors
 - Acoustics-based plastic pipe locators
 - Active probes, beacons, or sondes for non-metallic pipes
 - Magnetic polyethylene pipe
- Before self-performing any underground utility locating on a project, approval must be obtained from the appropriate WESTON DEHSM or the Corporate EHS Director.

Working Near or Around Underground Utilities

After the site has been properly evaluated for the presence of aboveground utilities, underground utilities, and other appurtenances, intrusive activities may begin. Because there is no perfect way of eliminating the hazards presented by underground utilities, an effort must be made to perform the tasks following the direction and guidance as described by the following best practices that should be implemented during the execution of the project.

Work Site Review

Before beginning intrusive activities, a meeting shall be held between all members of the project team. This shall consist of a review of the marked utility locations with the equipment operators, observers, laborers, etc.

Preservation of Marks

During excavation, efforts must be made to preserve the markings placed by the utility owners until they are no longer required. If any markings are obliterated, the One-Call Agency must be contacted for re-marking. No intrusive activities are to take place if markings are not visible.

Excavation Observer

Whenever intrusive operations are being conducted within three feet of the edge of the buffer zone, an observer must be assigned to monitor the activities. The observer will be designated each day, and a review of hand signals and other forms of communication between the observer and operator will be conducted. The directives of the observer will be followed precisely and immediately by those operating equipment.

Excavation Within The Buffer Zone

Mechanical means of excavation may not be used within 36 inches (see Buffer Zone) of any marked or suspect utility until the utility has been exposed. Mechanical methods may be used, as necessary, for initial penetration and removal of pavement, rock or other materials requiring use of mechanical means of excavation provided a spotter is used. Once the underground utility has been exposed, further excavation must be performed, employing reasonable precautions to avoid damage to the utility, including but not limited to any substantial weakening of structural or lateral support, or penetration or destruction of the utility or its protective coatings. For purposes of this section, “mechanical means of excavation” means excavation using any device or tool powered by an engine except air vacuum or like methods of excavation.

A request to utilize aggressive excavation methods in the buffer zone may be made if:

- There is no other appropriate and reasonable alternative to using aggressive methods in the buffer zone; and
- The utility has been de-energized (and purged if necessary), verified as de-energized, and locked-out; or
- The depth and orientation of the utility has been adequately and visually determined through the use of non-aggressive methods such as air/hydro/vacuum excavation, potholing, probing, hand-digging, or a combination thereof; and
- For utilities containing electrical energy, the depth of the existing water table is below the location of the utility; and
- Request for the exemption has been submitted to the appropriate DEHSM and Profit Center Manager for approval.

The following conditions will apply to this request:

- Aggressive methods may be used in the buffer zone only to the extent allowed by the applicable state or other jurisdictional regulations.
- Appropriate physical protection measures for exposed utilities shall be implemented to eliminate the potential for equipment contact with utilities.
- The extent of the project excavation area to be covered by the exemption request must be specified in the request for exemption.
- When evaluating the use of aggressive excavation methods in the buffer zone, the DEHSM will consider the type of utility involved and the associated risk potential. Based on this evaluation, the Profit Center Manager and/or DEHSM may impose further conditions and requirements. Even if the above exemption conditions are met, the DEHSM has authority to deny the request.

Unless exempted according to the above provisions of this procedure, only non-aggressive methods may be used within the buffer zone. These methods are used in order to prevent mechanical contact with underground utilities, which could result in damage to the utility and create the potential for personal injury and property damage. Following are examples of non-aggressive excavation methods:

- Hand-digging
 - Non-conductive hand tools must be used when digging within the buffer zone surrounding underground electrical utilities.
 - If conductive hand tools must be used near electrical lines, then the FSO and/or DEHSM shall be consulted to determine additional requirements relative to safe electrical practices, procedures, and equipment.
- Hydro-excavation (water pressure).
- Air excavation (air pressure).
- Vacuum extraction (soil excavation/removal).
- Air excavation/vacuum extraction combination.
- Aggressive methods may be used for the removal of pavement over a utility, if allowed by the state regulations.

Protection of Underground Utilities

It is very important that consideration be given to the protection of underground utilities when performing adjacent intrusive activities. This is necessary not only to prevent physical damage and associated indirect effects, but also to prevent the potential for injury to employees and the public.

- When using aggressive excavation methods within the buffer zone around exposed underground utilities, physical protection must be used as required by OSHA in 29 CFR 1926.651. Basically, this involves creation of a physical barrier between the mechanized operation and the utility. The following are some possible types of physical protective measures:
 - Heavy timbers, similar to swamp or crane mats.
 - Sheets of plywood.
 - Blasting mats.
- Once exposed, underground utilities no longer have the support provided by surrounding soil and may need to be physically supported to prevent shifting, bending, separation, or collapse, which could result in damage to the utility, and possibly personnel. Following are suggested support methods:
 - Timber shoring underneath the utility.
 - Timbers or girders over the top of the excavation fitted with hangers that support the utility.
 - Design by a Professional Engineer for complicated or large applications.
- Utilities must also be protected from objects that may fall into the excavation such as rocks and equipment. This can be accomplished by following these guidelines:
 - Cast spoils as far away from the excavation as possible. Excavated and loose materials shall be kept a minimum of two feet from the edge of excavations.
 - Relocate large rocks, cobbles, and boulders away from the excavation and sloped spoils piles.

- When vehicles and machinery are operating adjacent to excavations, warning systems such as soil berms, stop logs or barricades shall be utilized to prevent vehicles from entering the excavation or trench.
- Scaling or barricades shall be used to prevent rock and soils from falling into the excavation.
- Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.

De-Energizing Utilities

Utilities can carry many types of potential energy, including electricity, flowing liquids, liquids under pressure, or gasses under pressure. A release may happen if a utility conveyance is compromised and could result in personal injury, property damage, and other indirect effects. If the white lines of the proposed excavation area overlaps or extends into the buffer zone of a known underground utility, then if at all possible, that utility should be de-energized to physically prevent the transmission, flow, or release of energy. Conversely, if the buffer zone of the known utility lies outside of the white-lined, proposed excavation area, then de-energizing is not required.

- The owner of the utility shall be contacted to determine the feasibility and methodology of de-energizing the utility. Plenty of lead-time should be provided for this since it may take utility companies weeks to de-energize some utilities.
- Depending on the utility and the material being conveyed, isolation points which may be suitable for de-energizing include but are not limited to the following:
 - Electrical circuit breakers
 - Slide gate
 - Disconnect switches
 - Piping flanges
 - Other similar devices
- When utilities are de-energized, it must be verified by demonstration. This can be accomplished by methods such as, testing equipment, switching on a machine or lighting, or opening a valve. For any current-carrying electrical equipment, such as cables or electrical panels, successful de-energizing must be certified through the use of appropriate electrical testing equipment and qualified personnel.
- Whenever a utility is de-energized, a means of ensuring that the energy isolation device and equipment cannot be operated until the device is removed must be provided.
- When de-energizing and locking out of utilities is practiced, the provisions of FLD 42 Lockout/Tagout shall be followed, as applicable.

Damage Discovery

During excavation, utility damage may be discovered which is pre-existing or otherwise not related to a known contact. Disclosure to the utility owner is very important because the possibility of utility failure or endangerment of the surrounding population increases when damage has occurred. The utility may not immediately fail as a result of damage, but the utility owner or operator must be afforded the opportunity to inspect the utility and make a damage assessment and effect repairs if necessary. The following guidance applies:

- Observe and photograph the utility from a safe distance and determine if there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, or other damages to utility lines, conduits, coatings, or cathodic protection systems.

- The owner of the affected utility must be contacted immediately.
- The One-Call Agency or private location service must be contacted immediately.
- A Notification of Incident (NOI) Report will be used to document such a discovery.

Encountering Unexpected Underground Utilities

It is possible that underground utilities will be encountered in locations that have previously been “cleared” of having underground utilities by the locating service, or are found outside of the area, which has been marked as having underground utilities. In either case, if this occurs, the following applies:

- Site personnel must be warned and moved to a safe location; equipment engines and ignition sources should be turned off, if possible, as the operator is exiting his/her equipment.
- Intrusive activities must be stopped.
- The owner of the affected utility must be immediately contacted.
- The One-Call Agency or private location service must be contacted immediately.
- The PM, SM, and FSO must be notified.
- No further intrusive activities may be conducted until:
 - The One-Call Agency/private location service and/or the subject utility owner visit the site;
 - Identification of the utility owner and the type of material/energy being conveyed by the utility has been made; and
 - The orientation and depth of the subject utility has been determined and suitably marked.
- A NOI Report must be completed. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.

Contacting Underground Utilities

If excavation or other equipment being used for intrusive activities makes contact with an underground utility, the following guidelines apply:

- Site personnel must be warned and moved to a safe location; equipment engines and ignition sources should be turned off, if possible, as the operator is exiting his/her equipment.
- Intrusive activities must be stopped immediately.
- Observe the utility from a safe distance and determine if there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, scratched coatings, cathodic protection compromise, material leakage, obvious electrical energy.
- Move all personnel to the evacuation meeting point as described in the HASP.

EXCEPTION: *If an electrical line has been contacted and it is your belief that equipment (such as an excavator) is electrically energized, do not approach the equipment. Order the operator to remain in the equipment until emergency personnel can de-energize the source (unless the equipment is on fire, at which time the operator should jump off of the vehicle and shuffle along the ground to a safe area). Shuffling is required because current flows outward through the soil in a ripple pattern called a power gradient, creating a pattern of high and low potential, Shuffling decreases the chance that these gradients could be bridged, causing current to flow through the body, resulting in electrocution.*

- Secure the area to prevent the public from entering.
- Contact emergency responders as specified in the HASP.
- Immediately contact the One-Call Agency or if known, the utility owner.
- Notify the PM, SM, FSO and DEHSM.
- No further intrusive activities may be conducted until:
 - The utility owner inspects the scene and after repairs, verifies that all danger has passed.
 - The orientation and depth of the subject utility has been determined and suitably marked.
 - Permission from the emergency responders to resume work has been given.
- A WESTON NOI Report must be completed. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.
- State and Local regulations must be reviewed to determine if reporting to any additional agencies is required.

ATTACHMENTS

Attachment A – Underground Utilities Locating and Marking Checklist

Attachment B – Underground Utilities Management Checklist

Attachment C – Utilities Research Options

Attachment D – Sources of Information

Informational Addendum 16 June 2010

ATTACHMENT A
UNDERGROUND UTILITIES LOCATING AND MARKING CHECKLIST

Weston Solutions, Inc.

To be Completed by PM and/or "Competent Person"
Complete Form as Location/Marking Progresses and Maintain in Site Files

PROJECT INFORMATION:	Location:
Project Name:	Task/Activity:
WESTON Competent Person:	Start Date of Work:
WESTON Subcontractor: <input type="checkbox"/> No <input type="checkbox"/> Yes:	Private Locating Service Required: <input type="checkbox"/> Yes <input type="checkbox"/> No
Subcontractor Competent Person:	If Not, Explain:
Property Owner:	
NOTIFICATION:	
Locating Service Name:	Locating Service Tel. Number:
Date Locating Service Notified:	Locate Ticket Number:
Address of Property to be Marked:	Locate Ticket Expiration Date:
Nearest Intersecting Street:	
Are There Any Utilities on the Properties That the Locating Service Will Not Contact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Specify:	

Enter Utility Information in Table 1 Below. In Addition to Utility Locating Services, Consult Client, Utility Owners, Drawings, Facility Personnel, Maintenance Personnel, Municipalities (See Appendix C).

Table 1. On-Site Utility Information

Name of Utility Company	Type of Utility	Color Code	Utility Present On-Site?	Emergency Phone Number	Date Marks Completed
	Electric	RED			
	Communications, Phone, CATV	ORANGE			
	Gas, Oil, Steam, Petroleum	YELLOW			
	Sewers, Drains	GREEN			
	Potable Water	BLUE			
	Reclaimed Water, Irrigation	PURPLE			
	Temporary Survey Markings	PINK			
To be performed by excavator prior to utility mark-out.	Proposed Excavation	WHITE			

White-Lining Completed?

☐ No Explain: _____ ☐ Yes: Date: _____ By Whom? _____

LOCATING AND MARKING:

Have All Utilities Identified in Table 1 Been Marked?

☐ Yes ☐ No (If No, Contact Locating Service for Resolution)

Problem(s) With Markings?

☐ Yes ☐ No ☐ No Marks ☐ Incorrect Location ☐ Too Wide

☐ Other: _____ ☐ Not All Utilities Marked Per Table 1 (notify marking service)

Measurements Taken: ☐ Yes ☐ No

Documentation of Marks: ☐ Photos ☐ Video ☐ Other: _____

EXCAVATION:

Utilities Accurately Marked? ☐ Yes ☐ No

If no, describe: _____

Were Unmarked or Mis-Marked Utilities Encountered? ☐ Yes ☐ No

If Yes, Specify: _____

Locating Service Notified? ☐ Yes ☐ No

Will Excavation Continue Past Locate Number Expiration? ☐ Yes ☐ No

If Yes, Locate Number Renewed? ☐ Yes ☐ No New Expiration Date: _____

Any Other Problems/Concerns? Specify: _____

Form Completed By:	Signature:	Date:
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ATTACHMENT B
UNDERGROUND UTILITIES MANAGEMENT CHECKLIST

Weston Solutions, Inc.

To be Completed by PM and/or “Competent Person”

Complete Form as Project Progresses and Maintain in Site Files.

PHASE	TASK		YES	NO	NA	COMMENTS Required if Response is No or NA. (Reference Item Number)
Pre-Planning	1	Excavation/Best Practices in Work Scope?				
	2	Underground Utilities Identified?				
	3	Competent Person Assigned?				
	4	Has a Copy of the Applicable State Regulations Been Obtained, Read, Understood?				
	5	EHS Plan Addresses Underground Utilities? (AHAs, Contingency Plan, State Regulations Appendix)				
Identifying, Locating and Marking	6	Locating and Marking Checklist Initiated? (Attachment A)				
	7	Identification and Address of Property Determined, Including Nearest Intersection?				
	8	One-Call Agency Contacted?				
	9	Additional Locating and Marking Required on Property? (One-Call agency marks to public property line only)				
	10	Additional Marker/Locator Identified?				
	11	Additional Marker/Locator Qualified?				
	12	Weston Self-Performing Location and Marking?				
	13	If Yes to 12 Above, Approval From Division EHS Manager?				
	14	Area of Excavation “White-Lined” by WESTON?				
	15	WESTON Present When Markings Completed?				
	16	All Utilities Marked? (Refer to Attachment A, Table 1)				
	17	All Markings Photo/Video Documented?				

PHASE	TASK		YES	NO	NA	COMMENTS
						Required if Response is No or NA. (Reference Item Number)
Identifying, Locating and Marking – Continued	18	Area Checked for Signs of Previous Excavation? (Subsidence, new grass, patching, etc)				
	19	All Applicable Information Recorded on Attachment A?				
	20	Multiple Contractors Excavating On-Site?				
	21	Separate Locate Requests for All Contractors?				
	22	WESTON Subcontractors Excavating in WESTON White- Lined Area(s)?				
	23	If Yes to 22 Above, One-Call Agency Contacted to Determine if WESTON Subcontractor Can be Added to Existing Locate Ticket?				
Excavation Activities	24	Meeting and Site Walkover Conducted with Project Personnel? (Managers, Equipment Operators, Laborers, Competent Person, Excavation Observer, etc)				
	25	AHA and HASP Review Conducted With Personnel?				
	26	Do Site Activities Have Potential to Obliterate Utility Markings?				
	27	If Yes to 26 Above, Have Provisions Been Made to Preserve Markings?				
	28	Has an Excavation Observer Been Designated to Monitor Excavation When Occurring within 3 Feet of the Buffer Zone?				
	29	Have Operator and Observer Reviewed Commands and Signals?				
	30	Has WESTON-Required Buffer Zone Been Marked on Either Side of Markings Placed by Locator?				

PHASE	TASK		YES	NO	NA	COMMENTS
						Required if Response is No or NA. (Reference Item Number)
Excavation Within Buffer Zone	31	Is Excavation Within The Buffer Zone Absolutely Necessary?				
	32	If Yes to 31 Above, Can Non-Aggressive Methods Be Used For Excavation In The Buffer Zone? If Yes, Identify Appropriate Non-Aggressive Methods.				
	33	If No to 32 Above, Has a Buffer Zone Exemption Request Been Approved? If No, then Aggressive Methods May Not Be Used in The Buffer Zone.				
	34	If Yes to 33 Above, Has the Utility Been De-Energized, Purged, Verified/Tested, and Locked-Out? Or, Has The Depth and Orientation of the Utility Been Adequately and Visually Determined Through The Use of Non-Aggressive Methods?				
	35	If Yes to 34 Above, Have All of The Following Conditions Been Met? For Utilities Containing Electrical Energy, Is The Depth of The Water Table Below The Depth of The Utility? Have Regulations Been Consulted to Determine Specific State Requirements Relative to Excavating in The Buffer Zone? Have Appropriate Physical Protection Measures Been Implemented to Prevent Equipment Contact With Utilities and to Prevent Damage to Utilities? If No to Any of The Above Conditions, Then Only Non-Aggressive Excavation Methods May Conducted in The Buffer Zone, Since The Conditions of The Exemption Have Not Been Satisfied.				
Working Around Exposed Utilities	36	If Necessary, Have Provisions Been Made to Support the Utility During Work Activities?				
	37	Have Spoils Been Placed as far Away From the Excavation as Feasible?				

PHASE	TASK		YES	NO	NA	COMMENTS Required if Response is No or NA. (Reference Item Number)
Working Around Exposed Utilities – Continued	38	Has the Utility Been De-Energized? (If Any Portion of the Buffer Zone around a Utility is Inside of the White-Lined Area)				
	39	Has the Isolation Point for the De-Energized Utility Been Physically Locked-Out?				
	40	If No to 39 Above, Has a Spotter Been Assigned to Monitor Isolation Point?				
	41	If Yes to 40 Above, Does the Spotter Have Adequate Communications? (Radio, Telephone, etc)				
	42	Has the Isolation Point Been Tagged?				
Damage Discovery	43	Has Pre-Existing Damage to a Utility Been Discovered During Excavation?				
	44	If Yes to 43 Above, Has the One-Call Agency and/or Utility Owner Been Notified?				
	45	If Yes to 43 Above, Have Photographs Been taken?				
Encountering or Contacting Underground Utilities	46	Have Utilities Been Encountered in Locations That Have Not Been Marked?				
	47	If Yes to 46 Above, Has the One-Call Agency or Other Locating Service Been Contacted?				
	48	If Yes to 46 Above, Has the PM and Appropriate DSM Been Notified?				
	49	If Yes to 46 Above, Has a WESTON Notification of Incident (NOI) Report Been Completed? (Include Photographs)				
	50	Have Excavation Equipment Come In Contact With Underground utilities?				
	51	If Yes to 50 Above, Were Intrusive Activities Immediately Curtailed?				

PHASE	TASK		YES	NO	NA	COMMENTS
						Required if Response is No or NA. (Reference Item Number)
Encountering or Contacting Underground Utilities – Continued	52	If Yes to 50 Above, Has a Damage Determination Been Made From a Safe Distance?				
	53	If Yes to 50 Above, Has the Area Been Secured?				
	54	If Yes to 50 Above, Have Emergency Responders Been Notified?				
	55	If Yes to 50 Above, Has the Locating Agency and/or Utility Owner Been Notified?				
	56	If Yes to 50 Above, Have State and Local Reporting Requirements Been Met?				
	57	If Yes to 50 Above, Were Intrusive Activities Curtailed Until Inspection From Utility Owner, Orientation and Depth of Utility Was Determined and Marked, Permission From Emergency Responders Given?				
	58	If Yes to 50 Above, Has a WESTON Notification of Incident (NOI) Report Been Completed? (Include Photographs)				

CHECKLIST COMPLETED BY:

NAME

SIGNATURE

DATE

NAME

SIGNATURE

DATE

ATTACHMENT C
UTILITY RESEARCH OPTIONS

In the course of determining and verifying underground utility location it is expected that a minimum of two resources will be used. As a means of assisting the search for sources, the following is offered.

Records Sources:

- ☐ Utility Section of the State DOT or other Public Agency
- ☐ One-Call Center
- ☐ Public Service Commission or similar organization
- ☐ County Clerks Office
- ☐ Landowner
- ☐ Internet or Computer database
- ☐ Visual Site Inspection
- ☐ Utility Owner

From the Above Collect:

- ☐ Previous construction plans in the area
- ☐ Conduit maps
- ☐ Direct-Buried Cable records
- ☐ Distribution maps
- ☐ Service record maps
- ☐ As-built and record drawings
- ☐ Field notes
- ☐ County, city, utility owner or other geographic information system database
- ☐ Circuit diagrams
- ☐ Oral histories (current or previous employees, residents).

Review Records and Obtain Information For:

- ☐ Indications of additional and/or other available records
- ☐ Duplicate information that lends credibility to data
- ☐ Any additional need for clarifications from owners/others

ATTACHMENT D SOURCES OF INFORMATION

Organizations

- Common Ground Alliance
<http://www.commongroundalliance.com/wc.dll?cga~toppage>
- Center for Subsurface Strategic Action (CSSA)
<http://underspace.com/cs/index.htm>
- DigSafely
<http://www.digsafely.com/digsafely/default.asp>
- National Utility Contractors Association (NUCA)
<http://www.nuca.com/>
- National Utility Locating Contractors Association (NULCA)
<http://underspace.com/nu/index.htm>
- Underground Focus Magazine
<http://underspace.com/uf/index.htm>
- NUCA State Listing of One-Call centers
<http://www.nuca.com/>
- Utility Safety Magazine
<http://www.utilitysafety.com/>

Vendors and Commercial Sites

- RadioDetection, Inc. (Detection Instruments)
<http://www.radiodee.com/>
- Heath Consultants (Detection Instruments)
<http://www.heathus.com/>
- Ben Meadows Company (Detection Instruments)
<http://www.benmeadows.com/cgi-bin/SoftCart.exe/index.html?E+scstore>
- So-Deep, Inc. (Complete Utilities Services)
<http://www.sodeep.com/>
- Concept Engineering Group, Inc. (Air Excavation Equipment)
<http://www.air-spade.com/index.html>
- Rycom Instruments, Inc. (Detection Instruments)
<http://www.rycominstruments.com/>

- Schonstedt Instrument Company (Detection Instruments)
<http://www.schonstedt.com/>
- Forestry Suppliers, Inc. (Fiberglass Probe – “Fiberglass Tile Probe”, Part #77543,
Approx. \$20.00, Telephone 800-647-5368)
<http://www.forestry-suppliers.com/>

REFERENCES

Common Ground Study of One-Call Systems and Damage Prevention Best Practices, August 1999,
Sponsored by US DOT.

INFORMATIONAL ADDENDUM
16 JUNE 2010

Overview of Underground Utility Detection Methods

Induction Utility Locators

Induction utility locators operate by locating either a background signal or by locating a signal introduced into the utility line using a transmitter. There are three sources of background signals that can be located. A utility line can act like a radio antenna, transmitting electromagnetic signals that can be picked up with a receiver. AC power lines have a 50HZ signal associated with them. This signal occurs in all active AC power lines regardless of voltage. Utilities in close proximity to AC power lines or used as grounds may also have a 50HZ signal that can be located with a receiver. A signal can be indirectly induced onto a utility line by placing the transmitter above the line. Through a process of trial and error, the exact above position can be determined. A direct induced signal can be generated using an induction clamp. The inductor clamp induces a signal on specific utilities. This is the preferred method of tracing, where possible. By virtue of the closed loop, there is little chance of interference with the resulting signals. When access can be gained to a conduit, a flexible insulated trace wire can be used. The resulting signal loop can be traced. This is very useful for non-metallic conduits. Finally, these signals can be located horizontally on the surface using a receiver. The receiver is moved across the estimated location of the utility line until the highest signal strength is achieved. This is the approximate horizontal location of the utility. The receiver is then rotated until minimal signal strength is achieved. This will give the approximate orientation of the utility. Vertical depth, however, derived from this equipment is subject to gross error.

Magnetic Locators

Ferrous Metal or Magnetic locators operate by indicating the relative amounts of buried ferrous metals. They have limited application to locating and identifying utility lines but can be very useful for locating underground storage tanks (UST's) and buried manhole covers or other subsurface objects with a large ferrous metal content.

Electromagnetic Surveys

Electromagnetic survey equipment is used to locate metallic utilities. This method pulses the ground and records the signal retransmitted back to the unit from subsurface metal. Particularly useful for locating metal pipelines and conduit, this device also can help locate other subsurface objects such as UST's, buried foundations (that contain structural steel), and pilings and pile caps (that also contain steel).

Ground Penetrating Radar

Ground Penetrating Radar (GPR) is an electromagnetic method that detects interfaces between subsurface materials with differing dielectric constants (a term that describes an electrical parameter of a material). The GPR system consists of an antenna, which houses the transmitter and receiver; and a profiling recorder, which processes the received signal and produces a graphic display of the data. The transmitter radiates repetitive short-duration EM signals into the earth from an antenna moving across the ground surface. Electromagnetic waves are reflected back to the receiver by interfaces between materials with differing dielectric constants. The intensity of the reflected signal is a function of the contrast in the dielectric constant at the interface, the conductivity of the material, which the wave is traveling through, and the frequency of the signal. Subsurface features which may cause such reflections are: 1) natural geologic conditions such as changes in sediment composition, bedding and cementation horizons, voids, and water content; or 2) man-introduced materials or changes to the subsurface such as soil backfill, buried debris, tanks, pipelines, and utilities. The profiling recorder receives the signal from the antennae and produces a continuous cross section of the subsurface interface reflections, referred to as reflectors.

Depth of investigation of the GPR signal is highly site specific, and is limited by signal attenuation (absorption) of the subsurface materials. Signal attenuation is dependent upon the electrical conductivity of the subsurface materials. Signal attenuation is greatest in materials with relatively high electrical conductivity such as clays and brackish groundwater, and lowest in relatively low conductivity materials such as unsaturated sand or rock. Maximum depth of investigation is also dependent on antennae frequency and generally increases with decreasing frequency; however, the ability to identify smaller features is diminished as frequency decreases.

The various GPR antennas used are internally shielded from aboveground interference sources. Accordingly, the GPR signal is minimally affected by nearby aboveground conductive objects such as metal fences, overhead power lines, and vehicles.

A GPR survey is performed by towing an antenna across the ground along predetermined transect lines. The antennae is either pulled by a person or towed behind a vehicle. Preliminary GPR transects are performed over random areas of the site to calibrate the GPR equipment and characterize overall site conditions. The optimum time range settings are selected to provide the best combination of depth of investigation and data resolution for the subsurface conditions at the site. Ideally, the survey is performed along a pre-selected system of perpendicular or parallel transect lines. The configuration of the transect lines is designed based on the geometry and size of the target and the dimensions of the site. The beginning and ending points of the transect lines and grid intersection points, or nodes, are marked on the ground with spray paint or survey flags. A grid system is used to increase the probability of crossing the short axis of a target providing a more definitive signature in the data. The location of the antenna along a transect line is electronically marked on the cross section at each grid intersection point to allow correlation of the data to actual ground locations. The location of the targets can be marked on the ground surface using spray paint or survey flags.

Acoustic Location Methods

Acoustic location methods generally apply to waterlines. A highly sensitive Acoustic Receiver listens for background sounds of water flowing; (at joints, leaks, etc.) or to sounds introduced into the water main using a transducer. This method may have good identification results, but can be inaccurate. Acoustics can also be utilized to determine the location of plastic gas lines.

FLD 38 HAND AND POWER HAND TOOLS

REFERENCES

29 CFR 1926 Subpart I

29 CFR 1910 Subpart P

ANSI Standard A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools

RELATED FLDs

FLD 06 – Cold Stress

FLD 10 – Manual Lifting and Handling of Heavy Objects

FLD 16 – Pressure Systems: Compressed Gas Systems

FLD 35 – Electrical Safety

INTRODUCTION

Injuries from hand tools are often caused by improper use, using the wrong tool for the job, or from using a defective tool. Workers often assume that they know how to use a common hand tool. Working with something other than the simplest non-powered hand tools shall be performed only by those persons competent or qualified through formal training or documented experience.

Like all tools, hand and power tools must be maintained properly for effective use and safety. This Field Operating Procedure describes general safety guidelines for the four major categories of hand tools: cutting tools, torsion tools, impact tools, and power tools.

The use of any machinery, tool, material, or equipment which is not in compliance with any applicable OSHA 1910/1926 requirement is prohibited. Any tools or equipment identified as unsafe or defective will be “tagged or locked-out.” Controls shall be applied rendering the unsafe or defective tool or equipment inoperable. Any damaged or defective equipment shall be removed from its place of operation. Weston shall be responsible for the safe condition of tools and equipment used by employees, including tools and equipment that may be furnished by employees.

Tags shall be used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations, which are out of the ordinary, unexpected, or not readily apparent. Tags shall be used until the identified hazard is eliminated or the hazardous operation is completed. Tags need not be used where signs, guarding, or other positive means of protection are being used.

GENERAL SAFETY RULES – APPLICABLE TO USE OF ALL TOOLS

- Tools will be inspected prior to each use. Tools found to be unsafe will be tagged by the inspector “Do Not Use” and either repaired or removed from the site.
- Keep the work area clear of clutter.
- Keep the work area properly illuminated.
- Maintain and keep tools sharpened, oiled, and stored in a safe, dry place.
- Wear ear and eye protection when cutting, sawing, drilling, or grinding.
- Supervisor should instruct everyone using equipment on safe procedures before they use them.
- Inspect tools, cords, and accessories regularly and document any repairs.

- Repair or replace problem equipment immediately.
- Electric power tools must have a 3-wire cord plugged into a grounded receptacle, be double-insulated or powered by a low-voltage isolation transformer, and fitted with guards and safety switches.
- Machine guards must be in-place and not removed during equipment operation.
- Do not alter factory-supplied safety features on tools.
- Install and repair equipment only if you are qualified.
- Use the right tool for the job; for instance, do not use a screwdriver as a chisel or a wrench as a hammer.
- Carry a sharp tool pointed downward or place in a tool belt or toolbox.
- Protect a sharp blade with a shield.
- Store tools in drawers or chests with cutting edge down.
- When using power tools, wear long hair in a protective manner, do not wear jewelry or loose clothing, use safety glasses, respiratory protection, hard hats, etc., as needed/specified by the manufacturer. Note that protective gloves should not be worn when operating powered woodworking tools because of the possibility of the work piece snagging the glove and pulling the hand to the cutting surface.
- All hand-held power-driven tools must be equipped with one of the following: a constant pressure switch that shuts off the power upon release (e.g., circular saws, hand-held power drills, chain saws) or an on-off switch (e.g., routers, planers scrolls saws, jigsaws).
- Never leave a running tool unattended.
- All workers using hand and power tools must be properly trained, and training must be documented.
- Tools of a non-sparking material must be used if fire/explosion hazards exist.
- All fuel-operated tools shall be stopped and allowed to cool prior to being refueled, serviced, or maintained, and proper ventilation provided when used in enclosed spaces.
- Bench grinders shall be properly grounded. Work rests must be kept at a distance not to exceed 1/8 inch from the grinding wheel surface.
- All persons using grinders or abrasive wheels shall use approved eye-protective devices.
- Hand held grinders shall have grinding wheel guards in place during operation.
- Train personnel to recognize that tasks involving lifting, repetitive motion, excess pressure, vibration, awkward positions, and remaining stationary for prolonged periods and work in cold conditions increase the risk of musculoskeletal injury. Procedures for avoiding or minimizing risk include: using mechanical devices for lifting, following procedures in FLD 10 when manual lifting is necessary, using shock absorbing gloves when using vibrating tools, choosing tools that reduce gripping force and align joints in a neutral position or holding tools in an ergonomically neutral position, taking breaks or alternating repetitive jobs, and following procedures in FLD 06.
- Hand tools such as chisels and punches, which develop mushroomed heads during use must be taken out of service and reconditioned by qualified persons or replaced, as necessary.
- Broken or fractured handles on hammers, axes and similar equipment must be replaced promptly.
- Worn or bent wrenches must be replaced.

- Handles designed for use on files and similar tools must be used.
- Jacks must be checked periodically to ensure they are in good operating condition

TORSION TOOLS

Torsion tools are used to grip, fasten, and turn. These include wrenches, pliers, screwdrivers, vises, and clamps. There is a variety of each type of these tools. Selection is very important. Here are a few safety precautions for common torsion tools:

- Wrenches should always be pulled and not pushed. Pushing a wrench can cause a loss of control if there is a sudden release of pressure. A short, steady pull should be used rather than quick, jerky motions. Where available, use a socket wrench instead of an adjustable or open-ended wrench. Socket wrenches are generally easier to control, are more convenient, and are less likely to damage a bolt or nut. When using an adjustable wrench, the pressure should be applied to the fixed jaw
- Pipe wrenches can easily slip on pipes or fittings, causing injury. To prevent slipping, make sure that the pipe or fitting is clean and the wrench jaws are sharp and kept clean of oil and debris.
- Pliers should never be substituted for a wrench. They do not have the same gripping power and can easily slip on a tight object. When using cutting pliers, the object being cut can fly off and cause injury. Wear safety glasses when cutting with pliers.
- Screwdrivers are often misused. They should not be used for prying, or as punches or wedges. These misuses can damage the head of the screwdriver. A dull tip can cause the screwdriver to slip. The tip must be flat at the tip and tapered for a snug fit on the screw.
- When using vises, make sure that the vise is bolted solidly to a base (e.g., work bench). When cutting material in a vise, try to cut as close to the vise as possible to minimize vibration.
- Oil vises regularly.

Screwdrivers

- Most screwdrivers are not designed to be used on electrical equipment. Use an insulated screwdriver.
- Do not hold an object in the palm of one hand and press a screwdriver into it; place the object on a bench or a table.
- Never hammer with a screwdriver.
- Check for broken handles, bent blade, etc.
- Select a screwdriver of the proper size to fit the screw.
- Screwdrivers with a split or splintered handle shall not be used.
- The point shall be kept in proper shape with a file or grinding wheel.
- Screwdrivers shall not be used as a substitute punch, chisel, nail-puller, etc.

Pliers

- Do not use pliers as a substitute for hammers or wrenches.
- Use insulated pliers when doing electrical work.

- Inspect pliers frequently to make certain that they are free of breaks or cracks.
- Pliers shall be kept free from grease and oil and- the teeth or cutting edges shall be kept clean and sharp.
- The fulcrum pin, rivet or bolt shall be snug but not tight.

Wrenches

- Select the correct size of wrench for the job.
- Never use a piece of pipe or another wrench as a wrench handle extension.
- Too much leverage can ruin a tool and cause injury.
- To avoid sudden slips, stand in a balanced position and always pull on the wrench instead of pushing against the fixed jaw.
- Only wrenches in good condition shall be used; a bent wrench, if straightened, has been weakened and shall not be used.
- Watch for sprung jaws on adjustable wrenches.
- Always pull toward yourself, never push, since it is easier to brace against a sudden lunge toward you should the tool slip or break.
- When using a wrench on a tight nut - first use some penetrating oil, use the largest wrench available that fits the nut, when possible pull on the wrench handle rather than pushing, and when possible apply force to the wrench with both hands while both feet are firmly placed. Always assume that you may lose your footing - check the place where you may fall for sharp objects.
- Keep all pipe wrenches clean and in good repair. The jaws of pipe wrenches should be wire brushed frequently to prevent an accumulation of dirt and grease that would otherwise build up and cause wrenches to slip.
- Never use pipe wrenches in place of a rod holding device.
- Replace hook and heel jaws when they become visibly worn.
- Position your hands so that your fingers will not be smashed between the wrench handle and the ground or other work surface; when breaking joints the wrench may slip or the joint may suddenly let go.

IMPACT TOOLS

Impact tools include various types of hammers such as riveting hammers, carpenter's claw hammers, and sledgehammers. The main hazard associated with all these tools is damage to the hands and arms. The following safety procedures should be employed when using hammers:

- The handle shall be securely fitted and suited for the type of job and type of hammerhead. The striking face of the hammer shall be kept well dressed according to the application.
- The handle shall be smooth and free of oil to prevent slippage.
- Safety goggles shall be worn at all times when hammering to protect from flying nails, wood chips, and metal or plastic fragments.

- To properly drive a nail, hold the hammer near the end of the handle and start off with a light blow. Increase power after the nail is set.
- To avoid chipping or spalling of the hammerhead, use the lightest swing possible, hammer straight and not on an angle. Inspect the head of the hammer for potential chipping and spalling.

Hammers

- Use the correct hammer for the type of work to be done.
- Have an unobstructed swing when using a hammer and watch for overhead interference.
- Check for defects before using.
- The head of a hammer shall be wedged securely and squarely on the handle and neither the head nor the handle shall be chipped or broken.

CUTTING TOOLS

The main hazard associated with cutting tools is tool slippage. A dull tool or poor tool technique can cause a slip, which can redirect the cutting part of the tool toward the body. In addition, a sudden release or change in the force applied to a tool can throw the user off balance, possibly falling into another object, which may cause injury. To prevent slippage, tools shall be kept sharp and handled in such a way that, if a slip occurs, the direction of force will be away from the body. In addition, cutting along the grain of a material can help prevent changes in the pressure applied to the tool, thereby preventing slippage.

Chisels

- Always wear safety goggles or a face shield when using a chisel.
- Drive wood chisel outward and away from your body.
- Do not use chisels to pry.
- Keep edges sharp for most effective work and protect when not in use.

Knives

- Always cut away from the body.
- Keep hands and body clear of the knife stroke.
- Use a locking blade knife when possible.
- Keep blades sharp.
 - Knives and other sharp or edged tools must be maintained in proper condition. A sharp edged tool, used properly, is safer than a dull or improperly maintained tool.
 - When not in immediate use edged tools must be properly secured via, sheathing, closing, capping or covering.
 - Any task involving the use of an edged tool must be properly evaluated, alternatives to edged tools reviewed and training in the proper use, maintenance and handling verified by management and/or the site safety officer.
 - Knives, box cutters or like tools will not be authorized for cutting plastic wire ties or tubing. Use appropriately shaped and sized wire cutters or snips.
 - Remove knives from carry on luggage and place in checked baggage.

POWERED TOOLS

- Portable power tools shall be carefully inspected before use and shall be kept repaired.
- Switches and plugs must operate properly, and the cords must be clean and free from defects.
- Portable powered tools capable of receiving guards and/or designed to accommodate guards shall be equipped with guards to prevent the operator from having any part of his body in the danger zone during the operating cycle.
- Electric powered portable tools with exposed conducting parts shall be grounded. Portable tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed, the equipment shall be distinctively marked.
- Hand-held powered tools of a hazardous nature such as circular saws having a blade diameter greater than two inches, chain saws, percussion tools, drills, tappers, fasteners, drivers, grinders with wheels greater than two inches in diameter, disc sanders, belt sanders, reciprocating saws, saber scroll saws and jig saws with blade shanks greater than one-fourth inch, and other similarly operating powered tools shall be equipped with a constant pressure switch or control ("dead-man switch") that will shut the power off when the pressure is released.
- Portable circular saws having a blade diameter over two inches shall be equipped with guards or hoods which will automatically adjust themselves to the work when the saw is in use, so that none of the teeth are exposed to contact above the work. When withdrawn from the work, the guard shall completely cover the saw to at least the depth of the teeth. The saw shall not be used without a shoe or guide.
- Pneumatic powered portable tools shall be equipped with automatic air shut-off valves that stop the tool when the operators hand is no longer in contact with the tool. Safety clips, retainers, or other effective means shall be installed on pneumatic tools to prevent the tools from accidentally misfiring.
- Abrasive wheels with a diameter of more than two inches shall be used only on machines provided with safety guards. The guards shall cover the spindle end, nut, and flange projections. Guards on operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut, and other flanges are exposed.
- Explosive-actuated fastening tools' muzzle ends shall have a protective shield or guard designed to confine any flying fragments or particles. The tool shall be so designed that it cannot be fired unless it is equipped with a protective shield or guard. Weston Solutions, Inc. employees are not permitted to use a power-actuated tool until properly trained as prescribed by the manufacturer.

Extension Cords

See FLD 35, Electric Safety, for requirements and procedures for using extension cords.

SPECIALTY TOOLS

Pneumatic Powered Tools

Tools powered by air must be inspected and maintained as described above. Hose or tubing used to deliver air to pneumatic tools must be used as required and according to procedures in FLD 16, Pressure Systems: Compressed Gas Systems.

Powder-Actuated Tools

- Only employees who have been trained in the operation of the particular tool in use shall be allowed to operate a powder-actuated tool.
- Powder-actuated tools shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
- Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
- Personal protective equipment shall be selected in accordance with manufacturer's recommendations and in consideration of the potential hazards of the task.
- Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.
- Loaded tools shall not be left unattended.
- Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.
- Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
- No fastener shall be driven into a spalled area caused by an unsatisfactory fastening.
- Tools shall not be used in an explosive or flammable atmosphere.
- All tools shall be used with the correct shield, guard, or attachment recommended by the manufacturer.
- Powder-actuated tools used by employees shall meet all other applicable requirements of American National Standards Institute, A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools.

RST 3 FLD 43A ANIMALS

Animals represent hazards because of their poisons or venoms, size and aggressiveness, diseases transmitted, or the insects they may carry.

Feral Animals

Landfills and abandoned buildings often attract stray or abandoned dogs. These animals often become pack-oriented, very aggressive, and represent serious risk of harm to unprotected workers.

Workers entering abandoned buildings should be alert for such animals and avoid approaching them since this may provoke aggressive behavior. Avoidance and protection protocols include watching for animal dens, using good housekeeping, and using repellents.

Dangerous Wild Animals

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This FLD outlines actions that, when properly implemented, should provide a high degree of protection for WESTON employees and wildlife.

See Wildlife Hazard Recognition and Protection Procedure (Attached).

Venomous Snakes and Lizards

Venomous Snakes

Venomous snakes are common around the world. The major variables are the likelihood of encounter and the snake that is likely to be encountered. Encounters with snakes may be caused by moving containers, reaching into holes, or just walking through high grass, swampy areas, or rocks. **Do not attempt to catch any snakes.**

Symptom of venomous snake bites:

- Bloody wound discharge, blurred vision, burning, convulsions, diarrhea, dizziness, excessive sweating, fainting, fang marks in the skin, fever, increased thirst, local tissue death, loss of muscle coordination, nausea and vomiting, numbness and tingling, rapid pulse, severe pain, skin discoloration, swelling at the site of the bite, weakness.

Venom from venomous snakes and lizards can be divided into three types of toxins, however, there are some indications that snake venom may have more than one toxin and characteristics may change as a snake ages. The three types of toxins and their effects are:

Hemotoxins destroy blood cells and affect the circulatory system. The site of the bite rapidly becomes swollen, discolored, and painful. This is usually accompanied by swelling, discoloration, and pain progressing toward the heart.

Neurotoxins affect the nervous system and symptoms vary from foggy vision, dizziness, and other comparatively mild symptoms to rigid or flaccid paralysis, shortness of breath, weakness or paralysis of the lower limbs, double vision, inability to speak or swallow, drooping eyelids, and involuntary tremors of the facial muscles. Death can occur in as little as ten minutes, usually due to abrupt cessation of respiration.

Myotoxins destroy cells and cause muscle necrosis.

In the US, with the exception of the coral snakes which tend to have neuron-toxic venom, most venomous snakes have been categorized as having hemotoxic venom (in some areas Mojave rattlesnakes are found to have neuron-toxic venom). There is some indication that some species of rattlesnakes have both hemotoxic and neuron-toxic venom. It is also reported that venom of younger snakes may be more neuron-toxic

There are many highly venomous snakes worldwide, some are deadly and most can be deadly without proper care.

Geographical Listing of Venomous Snakes

Following is a list of poisonous snakes by geographic area. This list is extensive but may not be all inclusive. In planning for work around the world, also contact local agencies to determine whether there may be additional venomous snakes or lizards.

North America

Copperheads (Broad-banded, Northern, Osage, Southern, Trans-Pecos)

Rattlesnakes Diamondback (eastern and western), Massasauga (eastern and western)

Cottonmouth or water moccasin (Eastern)

Prevention of Bites

Key factors to working safely in areas where snakes or lizards may be encountered include:

- Be alert
- Use care when reaching into or moving containers
- Use sticks or long-handled tools when reaching where you cannot see
- Be familiar with the habits and habitats of snakes in the vicinity of an incident or site
- In areas or activities where encounters with snakes are likely, wear sturdy leather or rubber work boots and snake chaps
- Do not attempt to catch snakes unless required and qualified

A snake bite warrants medical attention after administration of proper first-aid procedures. It is important to contact local medical facilities to determine where anti-venoms are located.

First-Aid

1. Keep the person calm. Restrict movement, and keep the affected area below heart level to reduce the flow of venom.
2. Remove any rings or constricting items because the affected area may swell. Create a loose splint to help restrict movement of the area.
3. If the area of the bite begins to swell and change color, the snake was probably venomous.
4. Monitor the person's vital signs -- temperature, pulse, rate of breathing, and blood pressure if possible. If there are signs of shock (such as paleness), lay the person flat, raise the feet about a foot, and cover the person with a blanket.
5. Get medical help immediately.
6. Try to photograph or identify the snake. Do not waste time hunting for the snake, and do not risk another bite. Be careful of the head of a dead snake. A snake can actually bite for up to an hour after it is dead (from a reflex).
 - DO NOT allow the person to become over-exerted. If necessary, carry the person to safety.
 - DO NOT apply a tourniquet.
 - DO NOT apply cold compresses to a snake bite.
 - DO NOT cut into a snake bite with a knife or razor.
 - DO NOT try to suction the venom by mouth.
 - DO NOT give stimulants or pain medications unless instructed to do so by a doctor.
 - DO NOT give the person anything by mouth.
 - DO NOT raise the site of the bite above the level of the person's heart
 - Transport the victim to medical attention immediately

Animal Borne Diseases

Rabies

Animal borne diseases include rabies (generally found in dogs, skunks, raccoons, bats, and foxes). Rabies varies from area to area as do the animals most likely to be rabid.

Questions and Answers about Rabies

Q. What is Rabies and how is it transmitted?

A. Rabies is a viral infection most often transmitted by bites of animals infected with the virus.

Q. What animals are most likely to be infected?

A. Skunks, raccoons, foxes, and bats are wild animals most frequently found to be infected with rabies; however, any warm blooded animal can be infected. Squirrels, groundhogs, horses, cattle, and rabbits have been tested positive for rabies. Dogs and cats are frequently rabies-infected if not immunized.

Q. How can you tell if an animal is rabies-infected?

A. Rabies infection is not always apparent. Signs to look for in wild animals are over-aggressiveness or passivity. Spotting animals which are normally nocturnal (active at night) during the day and being able to approach them would be an example of unusual behavior. Finding a bat alive and on the ground is abnormal. The best precaution, however, is to observe wild animals from a safe distance, even if they are injured. Avoid dogs and cats that you do not know.

Q. What should you do if bitten by an animal you suspect is infected with rabies?

A. As quickly as possible, wash the bite area with soap and water, then disinfect with 70% alcohol and seek medical attention for follow-up. Try to capture the animal. Avoid being bitten again or contacting the mouth or any saliva of the animal. Keep the animal under surveillance and call the police for assistance to capture it. Have the animal tested.

A dead animal believed to be infected should be preserved and tested for rabies. Health departments are often sources where information can be found regarding testing.

Q. Is there a cure for rabies?

A. Rabies is preventable, even after being bitten, if treatment is begun soon enough. Getting prompt medical attention and confirming the rabies infection of an animal are very important. **Rabies is not curable once symptoms or signs of rabies appear.**

There are vaccines available that should be considered if a work assignment involves trapping animals likely to carry rabies. Medical consultants must be involved in decisions to immunize workers against rabies.

Hantavirus

WESTON employees or contractors/subcontractors conducting field work in areas where there is evidence of a rodent population should be aware of an increased level of concern regarding the transmission of “Hantavirus”-associated diseases. Hantavirus is associated with rodents, especially the deer mouse (*Peromyscus maniculans*) as a primary reservoir host. Hantavirus has resulted in several deaths in the U.S.

The Hantavirus can be transmitted by infected rodents through their saliva, urine, and feces. Human infection may occur when infected wastes are inhaled as a result of aerosols produced directly from the animals. They also may come from dried materials introduced into broken skin or onto mucous membranes. Infections in humans occur most in adults and are associated with

activities that provide contact with infected rodents in rural/semi-rural areas. Hantavirus begins with one or more flu-like symptoms (i.e., fever, muscle aches, headache, and/or cough) and progresses rapidly to severe lung disease. Early diagnosis and treatment are vital.

Prevention

Personnel involved in work areas where rodents and the presence of the Hantavirus are known or suspected will need to take personal protective measures and to develop an expanded site safety plan.

Field personnel involved in trapping or contacting rodents or their waste products will need to wear respirators with high-efficiency particulate air (HEPA) filters, eye protection, Tyvek coveralls, chemical-resistant gloves, and disposable boot covers. Strict decontamination requirements are needed. Double-bag, label, and specific handling, packaging, shipping, storage, and analytical procedures are required to minimize the risks of exposure from collected mice. More detailed procedures can be obtained from WESTON Corporate Health and Safety.

For employees and facilities in rural/semi-rural areas, the following risk-reduction strategies are appropriate:

- Eliminate rodents and reduce availability of food sources and nesting sites used by rodents.
- Store trash/garbage in rodent-proof metal or thick plastic containers with tight lids.
- Cut all grass/underbrush in proximity to buildings.
- Prevent rodents from entering buildings (e.g., use steel wool, screen, etc., to eliminate openings).

Plague

Described under Insects (Fleas)

Anthrax

Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in wild and domestic lower vertebrates (cattle, sheep, goats, and other herbivores), but it can also occur in humans when they are exposed to infected animals or tissue from infected animals.

Anthrax is most common in agricultural regions where it occurs in animals. When anthrax affects humans, it is usually due to an occupational exposure to infected animals or their products. Workers who are exposed to dead animals and animal products from other countries where anthrax is more common may become infected with *B. anthracis* (industrial anthrax). Anthrax in wild livestock has occurred in the U.S.

Anthrax infection can occur in three forms: cutaneous (skin), inhalation, and gastrointestinal. *B. anthracis* spores can live in the soil for many years, and humans can become infected with anthrax by handling products from infected animals or by inhaling anthrax spores from contaminated animal products. Anthrax can also be spread by eating undercooked meat from infected animals. It is rare to find infected animals in the U.S.

Cutaneous: Most (about 95%) anthrax infections occur when the bacterium enters a cut or abrasion on the skin, such as when handling contaminated wool, hides, leather, or hair products (especially goat hair) of infected animals. Skin infection begins as a raised itchy bump that resembles an insect bite but within 1-2 days develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the center. Lymph glands in the adjacent area may swell. About 20% of untreated cases of cutaneous anthrax will result in death. Deaths are rare with appropriate antimicrobial therapy.

Inhalation: Initial symptoms may resemble a common cold. After several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is usually fatal.

Intestinal: The intestinal disease form of anthrax may follow the consumption of contaminated meat and is characterized by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, and fever are followed by abdominal pain, vomiting of blood, and severe diarrhea. Intestinal anthrax results in death in 25% to 60% of cases.

Anthrax is not known to spread from one person to another person. Communicability is not a concern in managing or visiting patients with inhalation anthrax.

Prevention

In countries where anthrax is common and vaccination levels of animal herds are low, humans should avoid contact with livestock and animal products and avoid eating meat that has not been properly slaughtered and cooked. Also, an anthrax vaccine has been licensed for use in humans. The vaccine is reported to be 93% effective in protecting against anthrax.

Doctors can prescribe effective antibiotics. To be effective, treatment should be initiated early. If left untreated, the disease can be fatal.

Direct person-to-person spread of anthrax is extremely unlikely; however, a patient's clothing and body may be contaminated with anthrax spores. Effective decontamination of people can be accomplished by a thorough wash down with anti-microbe effective soap and water. Waste water should be treated with bleach or other anti-microbial agent. Effective decontamination of articles can be accomplished by boiling contaminated articles in water for 30 minutes or longer and using common disinfectants. Chlorine is effective in destroying spores and vegetative cells on surfaces. Burning the clothing is also effective. After decontamination, there is no need to immunize, treat, or isolate contacts of people ill with anthrax unless they also were also exposed to the same source of infection. Early antibiotic treatment of anthrax is essential—delay seriously lessens chances for survival. Treatment for anthrax infection and other bacterial infections

includes large doses of intravenous and oral antibiotics, such as fluoroquinolones, like ciprofloxacin (cipro), doxycycline, erythromycin, vancomycin, or penicillin. In possible cases of inhalation anthrax exposure to unvaccinated personnel, early antibiotic prophylaxis treatment is crucial to prevent possible death.

No skin, especially if it has any wounds or scratches, should be exposed. Disposable personal protective equipment is preferable, but if not available, decontamination can be achieved by washing any exposed equipment in hot water, bleach and detergent. Disposable personal protective equipment and filters should be burned and buried. The size of *Bacillus anthracis* bacilli ranges from 0.5 μm to 5.0 μm . Anyone working with anthrax in a suspected or confirmed victim should wear respiratory equipment capable of filtering this size of particle or smaller. The U.S. National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA) approved high efficiency-respirator, such as a half-face disposable respirator with a HEPA filter, is recommended. All possibly contaminated bedding or clothing should be isolated in double plastic bags and treated as possible bio-hazard waste. Dead victims that are opened and not burned provide an ideal source of anthrax spores; the victim should be sealed in an airtight body bag. Cremating victims is the preferred way of handling body disposal. No embalming or autopsy should be attempted without a fully equipped biohazard lab and trained and knowledgeable personnel.

Delays of only a few days may make the disease untreatable and treatment should be started even without symptoms if possible contamination or exposure is suspected. Animals with anthrax often just die without any apparent symptoms. Initial symptoms may resemble a common cold – sore throat, mild fever, muscle aches and malaise. After a few days, the symptoms may progress to severe breathing problems and shock and ultimately death. Death can occur from about two days to a month after exposure with deaths apparently peaking at about 8 days after exposure. [8] Antibiotic-resistant strains of anthrax are known.

Aerial spores can be trapped by a simple HEPA or P100 filter. Inhalation of anthrax spores can be prevented with a full-face mask using appropriate filtration. Unbroken skin can be decontaminated by washing with simple soap and water. All of these procedures do not kill the spores which are very hard to kill and require extensive treatment to eradicate them. Filters, clothes, etc. exposed to possible anthrax contaminated environments should be treated with chemicals or destroyed by fire to minimize the possibility of spreading the contamination.

In recent years there have been many attempts to develop new drugs against anthrax; but the existing supply still works fine if treatment is started soon enough.

Prevention can also be accomplished through early detection. In response to the U.S. Postal Service (USPS) anthrax attacks of October 2001, the USPS has installed BioDetection Systems (BDS) in their large-scale mail cancellation facilities. BDS response plans have been formulated by the USPS in conjunction with local responders including fire, police, hospitals, and public health. Employees of these facilities have been educated about anthrax, response actions and prophylactic medication. Because of the time delay inherent in getting final verification that anthrax has been used, prophylactic antibiotics for possibly exposed personnel should commence as soon as possible.

The ultimate in prevention is vaccination against infection but this has to be done well in advance of exposure.

Anthrax spores can survive for long periods of time in the environment after release. Methods for cleaning anthrax contaminated sites commonly use oxidizing agents such as peroxides, ethylene Oxide, Sandia Foam, chlorine dioxide (used in the Hart Senate office building), and liquid bleach products containing sodium hypochlorite. These agents slowly destroy bacterial spores. A bleach solution for treating hard surfaces has been approved by the EPA and can be prepared by mixing one part bleach (5.25%-6.00%) to one part white vinegar to eight parts water. Bleach and vinegar must not be combined together directly, rather some water must first be added to the bleach (e.g., two cups water to one cup of bleach), then vinegar (e.g., one cup), and then the rest of the water (e.g., six cups). The pH of the solution should be tested with a paper test strip; and treated surfaces must remain in contact with the bleach solution for 60 minutes (repeated applications will be necessary to keep the surfaces wet).

Chlorine dioxide has emerged as the preferred biocide against anthrax-contaminated sites, having been employed in the treatment of numerous government buildings over the past decade. Its chief drawback is the need for in situ processes to have the reactant on demand.

To speed the process, trace amounts of a non-toxic catalyst composed of iron and tetra-amido macrocyclic ligands are combined with sodium carbonate and bicarbonate and converted into a spray. The spray formula is applied to an infested area and is followed by another spray containing tertiary-butyl hydroperoxide

Using the catalyst method, a complete destruction of all anthrax spores takes 30 minutes. A standard catalyst-free spray destroys fewer than half the spores in the same amount of time. They can be heated, exposed to the harshest chemicals, and they do not easily die.

Brucellosis

Brucellosis, also called undulant fever or Malta fever, is a zoonosis (infectious disease transmitted from animals to humans) caused by bacteria of the genus *Brucella*. It is primarily a disease of domestic animals (goats, pigs, cattle, dogs, etc.) and humans and has a worldwide distribution.

Although brucellosis can be found worldwide, it is more common in countries that do not have good standardized and effective public health and domestic animal health programs. Areas currently listed as high risk include the Caribbean.

The disease is transmitted either through contaminated or untreated milk (and its derivatives) or through direct contact with infected animals, which may include dogs, pigs, camels, and ruminants, primarily sheep, goats, cattle, and bison. This also includes contact with their carcasses.

Leftovers from parturition are also extremely rich in highly virulent brucellae. Brucellae, along with leptospira have the unique property of being able to penetrate through intact human skin, so infection by mere hand contact with infectious material is likely to occur.

The disease is now usually associated with the consumption of un-pasteurized milk and soft cheeses made from the milk of infected animals and with occupational exposure of veterinarians and slaughterhouse workers. Some vaccines used in livestock, most notably *B. abortus* strain 19 also cause disease in humans if accidentally injected. Problems with vaccine induced cases in the United States declined after the release of the RB-51 strain developed in the 1990s and the relaxation of laws requiring vaccination of cattle in many states.

The incubation period of brucellosis is, usually, of one to three weeks, but some rare instances may take several months to surface.

Brucellosis induces inconstant fevers, sweating, weakness, anemia, headaches, depression and muscular and bodily pain.

The symptoms are like those associated with many other febrile diseases, but with emphasis on muscular pain and sweating. The duration of the disease can vary from a few weeks to many months or even years. In first stage of the disease, septicaemia occurs and leads to the classic triad of undulant fevers, sweating (often with characteristic smell, likened to wet hay) and migratory arthralgia and myalgia.

Prevention

The main way of preventing brucellosis is by using fastidious hygiene in producing raw milk products, or by pasteurization of all milk that is to be ingested by human beings, either in its pure form or as a derivate, such as cheese.

Provide protection from skin contact when handling potentially infected animals.

Q fever

Q fever is caused by infection with *Coxiella burnetii*. This organism is uncommon but may be found in cattle, sheep, goats and other domestic mammals, including cats and dogs. The infection results from inhalation of contaminated particles in the air, and from contact with the vaginal mucus, milk, feces, urine or semen of infected animals. The incubation period is 9-40 days. It is considered possibly the most infectious disease in the world, as a human being can be infected by a single bacterium.

The most common manifestation is flu-like symptoms with abrupt onset of fever, malaise, profuse perspiration, severe headache, myalgia (muscle pain), joint pain, loss of appetite, upper respiratory problems, dry cough, pleuritic pain, chills, confusion and gastro-intestinal symptoms such as nausea, vomiting and diarrhea. The fever lasts approximately 7-14 days.

During the course, the disease can progress to an atypical pneumonia, which can result in a life threatening acute respiratory distress syndrome (ARDS), whereby such symptoms usually occur during the first 4-5 days of infection.

Less often the Q fever causes (granulomatous) hepatitis which becomes symptomatic with malaise, fever, liver enlargement (hepatomegaly), pain in the right upper quadrant of the abdomen and jaundice (icterus).

The chronic form of the Q fever is virtually identical with the inflammation of the inner lining of the heart (endocarditis), which can occur after months or decades following the infection. It is usually deadly if untreated. However, with appropriate treatment this lethality is around 10%.

The common way of infection is inhalation of contaminated dust, contact with contaminated milk, meat, wool and particularly birthing products. Ticks can transfer the pathogenic agent to other animals. Transfer between humans seems extremely rare and has so far been described in very few cases.

Prevention

Q fever is effectively prevented by intradermal vaccination with a vaccine composed of killed *Coxiella burnetii* organisms. Skin and blood tests should be done before vaccination to identify preexisting immunity; the reason is that vaccinating subjects who already have immunity can result in a severe local reaction. After a single dose of vaccine, protective immunity lasts for many years. Revaccination is not generally required. Annual screening is typically recommended.

Wear appropriate PPE when handling potentially infected animals or materials.

Leptospirosis

Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus *Leptospira*.

The time between a person's exposure to a contaminated source and becoming sick is 2 days to 4 weeks. Illness usually begins abruptly with fever and other symptoms. Leptospirosis may occur in two phases; after the first phase, with fever, chills, headache, muscle aches, vomiting, or diarrhea, the patient may recover for a time but become ill again. If a second phase occurs, it is more severe; the person may have kidney or liver failure or meningitis. This phase is also called Weil's disease.

The illness lasts from a few days to 3 weeks or longer. Without treatment, recovery may take several months. In rare cases death occurs.

Many of these symptoms can be mistaken for other diseases. Leptospirosis is confirmed by laboratory testing of a blood or urine sample.

Leptospira organisms have been found in cattle, pigs, horses, dogs, rodents, and wild animals. Humans become infected through contact with water, food, or soil containing waste from these infected animals. This may happen by consuming contaminated food or water or through skin contact, especially with mucosal surfaces, such as the eyes or nose, or with broken skin. The disease is not known to be spread from person to person.

Leptospirosis occurs worldwide but is most common in temperate or tropical climates. It is an occupational hazard for many people who work outdoors or with animals, for example, farmers, sewer workers, veterinarians, fish workers, dairy farmers, or military personnel. It is a recreational hazard for campers or those who participate in outdoor sports in contaminated areas and has been associated with swimming, wading, and whitewater rafting in contaminated lakes and rivers. The incidence is also increasing among urban children.

The risk of acquiring leptospirosis can be greatly reduced by not swimming or wading in water that might be contaminated with animal urine.

Protective clothing or footwear should be worn by those exposed to contaminated water or soil because of their job or recreational activities.

Prevention

Avoid risky foods and drinks.

Buy it bottled or bring it to a rolling boil for 1 minute before drink it. Bottled carbonated water is safer than non-carbonated water.

Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.

Eat foods that have been thoroughly cooked and that are still hot and steaming

Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well. When eating raw fruit or vegetables that can be peeled, peel them yourself. (Wash your hands with soap first.) Do not eat the peelings.

Avoid foods and beverages from street vendors. It is difficult for food to be kept clean on the street, and many travelers get sick from food bought from street vendors.

Leptospirosis is treated with antibiotics, such as doxycycline or penicillin, which should be given early in the course of the disease. Intravenous antibiotics may be required for persons with more severe symptoms. Persons with symptoms suggestive of leptospirosis should contact a health care provider.

Ebola

Ebola is both the common term used to describe a group of viruses belonging to genus Ebolavirus, family Filoviridae, and the common name for the disease which they cause, Ebola hemorrhagic fever. Ebola viruses are morphologically similar to the Marburg virus, also in the family Filoviridae, and share similar disease symptoms. Ebola has caused a number of serious and highly publicized outbreaks since its discovery.

Despite considerable effort by the World Health Organization, no animal reservoir capable of sustaining the virus between outbreaks has been identified. However, it has been hypothesized that the most likely candidate is the fruit bat.

Ebola hemorrhagic fever is potentially lethal and encompasses a range of symptoms including fever, vomiting, diarrhea, generalized pain or malaise, and sometimes internal and external bleeding. Mortality rates are extremely high, with the human case-fatality rate ranging from 50% - 89%, according to viral subtype. ^[2] The cause of death is usually due to hypovolemic shock or organ failure.

Because Ebola is potentially lethal and since no approved vaccine or treatment is available, Ebola is classified as a biosafety level 4 agent, as well as a Category A bioterrorism agent by the Centers for Disease Control and Prevention.

Symptoms are varied and often appear suddenly. Initial symptoms include high fever (at least 38.8°C), severe headache, muscle joint, or abdominal pain, severe weakness and exhaustion, sore throat, nausea, and dizziness. Before an outbreak is suspected, these early symptoms are easily mistaken for malaria, typhoid fever, dysentery, influenza, or various bacterial infections, which are all far more common and less reliably fatal.

Ebola may progress to cause more serious symptoms, such as diarrhea, dark or bloody feces, vomiting blood, red eyes due to distention and hemorrhage of sclerotic arterioles, petechia, maculopapular rash, and purpura. Other secondary symptoms include hypotension (less than 90 mm Hg systolic /60 mm Hg diastolic), hypovolemia, tachycardia, organ damage (especially the kidneys, spleen, and liver) as a result of disseminated systemic necrosis, and proteinuria. The interior bleeding is caused by a chemical reaction between the virus and the platelets which creates a chemical that will cut cell sized holes into the capillary walls.

Among humans, the virus is transmitted by direct contact with infected body fluids, or to a lesser extent, skin or mucus membrane contact. The incubation period can be anywhere from 2 to 21 days, but is generally between 5 and 10 days.

Although airborne transmission between monkeys has been demonstrated by an accidental outbreak in a laboratory located in Virginia, USA, there is very limited evidence for human-to-human airborne transmission in any reported epidemics.

The infection of human cases with Ebola virus has been documented through the handling of infected chimpanzees, and gorillas--both dead and alive.

So far, all epidemics of Ebola have occurred in sub-optimal hospital conditions, where practices of basic hygiene and sanitation are often either luxuries or unknown to caretakers and where disposable needles and autoclaves are unavailable or too expensive. In modern hospitals with disposable needles and knowledge of basic hygiene and barrier nursing techniques, Ebola rarely spreads on such a large scale.

Prevention

Prevention methods include good hygiene in medical settings and awareness of the virus in travel areas. There is no known effective vaccine for humans.

Prevention efforts should concentrate on avoiding contact with host or vector species. Travelers should not visit locations where an outbreak is occurring. Contact with rodents should be avoided. Minimize exposure to arthropod bites by using permethrin-impregnated bed nets and insect repellents.

Strict compliance with infection control precautions (i.e., use of disposable gloves, face shields, and disposable gowns to prevent direct contact with body fluids and splashes to mucous membranes when caring for patients or handling clinical specimens; appropriate use and disposal of sharp instruments; hand washing and use of disinfectants) is recommended to avoid health care-associated infections.

Contact with dead primates should be avoided.

Bird and Bat Borne or Enhanced Diseases

See also under Molds and Fungus

Histoplasmosis

Histoplasmosis is a fungal infection which enters the body through the lungs. The infection enters the body through the lungs. The fungus grows as a mold in the soil, and infection results from breathing in airborne particles. Soil contaminated with bird or bat droppings are known to have a higher concentration of histoplasmosis.

There may be a short period of active infection, or it can become chronic and spread throughout the body. Most people who do develop symptoms will have a flu-like syndrome (acute-fever, chills cough, and chest pain; chronic-chest pain, cough with blood, fever, shortness of breath, sweating) and lung complaints related to pneumonia or other lung involvement. Approximately 10% of the population will develop inflammation in response to the initial infection. This can affect the skin, bones or joints, or the lining of the heart (pericardium). These symptoms are not due to fungal infection of those body parts, but due to inflammation.

In a small number of patients, histoplasmosis may become widespread (disseminated) and involve the blood, brain, adrenal glands, or other organs. Very young or old are at a higher risk for

disseminated histoplasmosis. Symptoms include fevers, headache, neck stiffness, mouth sores, skin lesions.

Histoplasmosis may be prevented by reducing dust exposure in areas containing bird or bat droppings. Wear PPE and respirator when working within this environment. Institute work practices and dust control measures, i.e. moist/wet area, that eliminate or reduce dust generation which will reduce risks of infection and subsequent development of disease.

Treatment

The main treatment for histoplasmosis is antifungal drugs. Amphotericin B, itraconazole, and ketoconazole are the usual treatments. Long-term treatment with antifungal drugs may be needed.

Psittacosis

Psittacosis is a disease caused by a bacteria that is found in bird droppings and other secretions (often carried by pet birds). The bacteria is found worldwide.

Symptoms of psittacosis infection may include a low-grade fever that often becomes worse as the disease progresses, including anorexia, sore throat, light sensitivity, and a severe headache.

Ammonia and sodium hypochlorite based disinfectants are effective disinfectants for Psittacosis.

Where it is necessary to remove bat droppings from buildings prior to renovation or demolition it is prudent to assume infection and use the following precautions:

- Avoid areas that may harbor the bacteria, e.g., accumulations of bird or bat droppings.
- Areas known or suspected of being contaminated by *the organisms causing* Psittacosis such as bird roosts, attics, or even entire buildings that contain accumulations of bat or bird manure, should be posted with signs warning of the health risk. The building or area should be secured
- Before an activity is started that may disturb any material that might be contaminated by Psittacosis, workers should be informed in writing of the personal risk factors that increase an individual's chances of developing these diseases. Such a written communication should include a warning that individuals with weakened immune systems are at the greatest risk of developing severe forms of these diseases become infected. These people should seek advice from their health care provider about whether they should avoid exposure to materials that might be contaminated with these organisms.

The best way to prevent exposure is to avoid situations where material that might be contaminated can become aerosolized and subsequently inhaled. A brief inhalation exposure

highly contaminated dust may be all that is needed to cause infection and subsequent development of psittacosis. Therefore, work practices and dust control measures that eliminate or reduce dust generation during the removal of bat manure from a building will also reduce risks of infection and subsequent development of disease. For example, instead of shoveling or sweeping dry, dusty material, carefully wetting it with a water spray can reduce the amount of dust aerosolized during an activity. Adding a surfactant or wetting agent to the water might reduce further the amount of aerosolized dust.

Once the material is wetted, it can be collected in double, heavy-duty plastic bags, a 55-gallon drum, or some other secure container for immediate disposal. An alternative method is use of an industrial vacuum cleaner with a high-efficiency filter to *bag* contaminated material. Truck-mounted or trailer-mounted vacuum systems are recommended for buildings with large accumulations of bat or bird manure. These high-volume systems can remove tons of contaminated material in a short period. Using long, large-diameter hoses, such a system can also remove contaminated material located several stories above its waste hopper. This advantage eliminates the risk of dust exposure that can happen when bags tear accidentally or containers break during their transfer to the ground.

The removal of all material that might be contaminated from a building and immediate waste disposal will eliminate any further risk that someone might be exposed to aerosolized spores. Air sampling, surface sampling, or the use of any other method intended to confirm that no infectious agents remain following removal of bat manure is unnecessary in most cases. However, before a removal activity is considered finished, the cleaned area should be inspected visually to ensure that no residual dust or debris remains.

Spraying 1:10 bleach to water mixture on droppings and allowing it to dry is also a recommended practice for the psittacosis organisms.

Because work practices and dust control measures to reduce worker exposures to these organisms have not been fully evaluated, using personal protective equipment is still necessary during some activities. During removal of an accumulation of bat or bird manure from an enclosed area such as an attic, dust control measures should be used, but wearing a NIOSH-approved respirator and other items of personal protective equipment is also recommended to reduce further the risk of exposure to the organisms that cause Psittacosis.

Treatment

Psittacosis is often hard to diagnoses and while a concern, it does not occur with great frequency. Knowledge of the symptoms and of potential exposure is important when seeking medical follow-up for potential exposure.

There are various medical treatments for psittacosis based on extent of infection. The sooner the disease is diagnosed and treatment is begun the more effective the treatment will be.

APPENDIX A

Dangerous Animals - Wildlife Hazard Recognition and Protection

GENERAL

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This procedure outlines actions that when properly implemented should provide a high degree of protection for employees and wildlife.

These procedures apply to employees who prepare Health and Safety Plans or perform fieldwork in environments in which wild animals may be encountered. However, due to the unpredictable nature of wild animals this single document cannot possibly cover all potential risks or protective measures. Therefore, prior to entering remote areas inhabited by dangerous wildlife, contact local wildlife agencies to gather additional information concerning local risks and protective measures.

ATTACHMENTS

Attachments 1 and 2 outline behavioral characteristics of and outline controls that will minimize human injury, loss of property, and unnecessary destruction of wildlife, while ensuring a safe work environment.

WILDLIFE AVOIDANCE AND BASIC PROTECTIVE MEASURES

The best protective measure is simply avoidance. Large numbers of humans present deterrence to wild animals; therefore, whenever possible teams in the field should work together in groups of four or more. Whenever practical, fieldwork should be scheduled around the seasonal cycles of wildlife in the area. When wild animal avoidance cannot be achieved through scheduling, personnel involved in field activities in which encounters with wild animals may result, will take the following steps and will be equipped and trained, as set forth below.

CLEAR THE AREA

Evaluate and control the area before entry by

- Determine areas of recent sightings through local Fish and Game, state troopers, etc.;
- Conduct a site observation from an off-site elevated point, if possible;
- Conduct a controlled walk through in the area by a trained observer;
- Arrange a briefing by a local specialist, e. g., Fish and Game, etc.; and
- Utilizing appropriate noisemakers.

BASIC EQUIPMENT

Employees entering an environment where encounters with wild animals are possible should be provided, as a minimum:

- Noisemakers, such as air horns, bells, etc.; and
- Bear spray of not less than 16-ounce capacity (with holster), equivalent to capsicum pepper (red pepper extract), which is capable of spraying at least 15 feet. (Notes: Normally cannot be transported in side aircraft passenger compartments and may be

considered a hazardous material, check with airlines and hazardous material shippers for current information).

TRAINING

Prior to entering and / or working in areas inhabited by dangerous wildlife each employee should receive training as outlined in this procedure. At a minimum, training must include information related to:

- Wildlife present, habitat, behavior patterns, including when wild animals are most active, etc.
- Warning signs, such as tracks, bedding areas, scat, claw marks, offspring, paths, etc.,
- Avoidance measures
- Other hazards, precautions, and protective measures as outlined in the Attachments,
- (At the jobsite) spray demonstration and safety instructions which include location of and persons designated as “bear watch”

An outline of the training content should be reviewed and approved by the Divisional EHS manager and should be documented. A record of the training will be maintained at the job site, filed with the SSHSP and in the employee’s training records.

VEHICLE SAFETY

Use extreme caution, particularly in darkness, when operating vehicles in areas where wild animals may be present. Collisions with large animals have been known to cause significant property damage and personal injuries to vehicle passengers, including fatalities.

ATTACHMENT 1

BEAR SAFETY – HAZARD RECOGNITION AND PRECAUTIONS

On occasion fieldwork may be conducted in a location where bears may be encountered. The following technical information, precautions, and guidelines for operations in which bears could be encountered are based on experience and conditions for field work. Bears are intelligent, wild animals and are potentially dangerous, and would rather be left alone. The more bears are understood the less they will be feared. This attachment is intended to provide information that will enable Weston to plan for bear encounters and to properly address face-to-face encounters.

Bear Life History

Although bears are creatures of habit, they are also intelligent, and each has its own personality. The way a bear reacts is often dictated by what it has learned from its mother, the experience it has had on its own, and the instincts nature has provided. Like other intelligent animals, we can make general statements about bears, but few people can accurately predict their behavior.

Bears have an incredible sense of smell, and seem to trust it more than any other sense. Hearing and sight are also important, but to a lesser degree. A bear's hearing is probably better than ours, but not as keen as a dog's hearing. Their sight is probably comparable to that of a human. Black bears tend to favor forested habitats.

Bears are opportunists, relying on their intelligence and their senses to find food. They use different habitats throughout the year, depending on the availability of food and other necessities. The area a bear covers in a given year is partially dependent on how far it has to go to satisfy these basic needs. In some areas, individual bears have home ranges of less than a square mile; in other areas ranges can encompass hundreds of square miles. Males usually range over larger areas than females.

In spring, bears begin coming out of hibernation. Males are usually the first bears to emerge, usually in April, and females with new cubs are usually the last, sometimes as late as late June. When bears emerge from their dens, they are lethargic for the first few days, frequently sleeping near their dens and not eating. When they do start eating, they seek carrion (deer, etc.), roots, and emerging vegetation. In coastal areas, beaches become travel corridors as bears seek these foods.

In early summer, bears eat new grasses and forage as they develop in higher elevations. In coastal areas, salmon are the most important food from June through September. This period is one of the few times that bears are found in large groups, and it is the time that most people see bears. Bears often travel, eat, and sleep along streams for weeks at a time.

Other summer foods for bears include grasses and ground squirrels. When bears kill or scavenge large prey, they commonly cover the portions they cannot eat with sticks and duff. A bear may remain near a food cache for days and it will defend it from intruders.

During the late summer and early fall, bears move inland and consume large amounts of blueberries, and other succulent fruits. As the seasons progress towards winter, a bear's diet becomes more varied. This is the time that bears are adding final deposits of fat before their long winter naps.

In October and November, bears move into their denning areas and begin preparing a suitable den. Black bears usually den in holes under large trees or rock outcrops, or in small natural cavities. Dens are just large enough for the bears to squeeze into. Bears rarely eat, drink, urinate, or defecate while they are denning. They sleep deeply, but do not truly hibernate, and they can be awakened by loud noises or disturbances.

Cubs are born in the den, usually in January. Black bear cubs usually stay with their mothers for a year and a half. Black bears are sexually mature at age 2. Mating season is in the spring (May or June) and both species are polygamous (multiple mates). Black bears can live for 25 – 30 years, although most live less than 20 years.

BEAR AND HUMAN INTERACTIONS

Bears generally prefer to be left alone, but they share their homes with other creatures, including humans, who intrude on virtually every aspect of the bear's life. Bears are normally tolerant of these activities and generally find a secure way to avoid them. Humans can help bears make a graceful retreat and avoid many close encounters by letting them know we are coming. Walking in groups, talking, and wearing noise making devices, such as bear bells, all serve to warn a bear of your approach. When possible, avoid hiking and camping in areas where bears are common, such as bear trails through heavy brush or along salmon streams. Always keep an eye out for bears and bear signs. If you happen upon a dead animal, especially one that is covered with sticks and duff (a bear cache), immediately retreat the way you came, but do not run, and make a detour around the area. If you see a cub up a tree or a small bear walking alone, immediately retreat and detour around the area. Like all young animals, cubs wander away from their mothers, but females are furiously protective when they believe their cubs are threatened. Even if we do everything possible to avoid meeting a bear, sometimes bears come to us.

Bears are both intelligent and opportunistic, and they express these qualities through their curiosity. This curiosity frequently brings them into "human habitat." When this happens, we often feel vulnerable, and the bear is sometimes viewed as a threat or nuisance. In most cases, a curious bear will investigate a "human sign," perhaps test it out (chew on a raft, bite into some cans, etc.), and leave, never to return. If the bear was rewarded during his investigation by finding something to eat, it is hard to stop them from returning once they have had a food-reward. That is why we emphasize the importance of keeping human food and garbage away from bears. When in bear country, always think about the way you store, cook, and dispose of your food. **Never feed bears!** This is both illegal and foolish. Food should be stored in airtight containers, preferably away from living and sleeping areas. Garbage should be thoroughly incinerated as soon as possible. Fish and game should be cleaned well away from camp, and clothing that smells of fish and game should be stored away from sleeping areas. Menstruating women should take extra precautions to keep themselves as clean as possible, and soiled tampons and pads should

be treated as another form of organic garbage. Once a bear has obtained food from people, it may continue to frequent areas occupied by people. If a bear does not find food or garbage after the next few tries, it may give up and move back into a more natural feeding pattern. Occasionally, though, the bear will continue to seek human foods and can become a “problem bear.” Some bears become bold enough to raid campsites and break into cabins to search for human food. Shooting bears in the rump with cracker shells, flares, rubber bullets, and birdshot are common methods of “aversive conditioning.” These are also very dangerous techniques, because they may seriously injure a bear if not done properly and/or they may cause a bear to attack the shooter.

BLACK BEARS

Black Bear Identification: Black bears are the smallest and most abundant of the bear species. They are five to six feet long and stand about two to three feet high at the shoulders. They weigh from 200 to 500 pounds. While they are most commonly black, other color phases include brown (cinnamon), and, rarely, gray (blue), and white. Muzzles are usually brown. Black bears can be distinguished from brown bears by:

- Their head shape (a black bear’s nose is straight in profile, a brown bear’s is dished);
- Their claws (black bear’s claws are curved and smaller, brown bears are relatively straight and longer);
- Their body shape (when standing, a black bear’s rump seems to be higher than its shoulders; a brown bear’s shoulders are usually higher than its rump); and

Typical Habitat: Black bears occupy a wide range of habitats, but seem to be most common in forested areas.

AVOIDING BEAR ENCOUNTERS WHEN

- The Bear sees you but you do not know the bear is around: The bear will likely avoid detection people and will simply move away when they sense a human.
- You see a bear and it does not know you are there: Move away slowly. Avoid intercepting the bear if it is walking. If possible, detour around the bear. If the bear is close to you, stand where you are or back away slowly. Do not act threateningly toward the bear, it may know you are there but it has chosen to ignore you as long as you are not a threat.
- You see the bear and the bear sees you: Do not act threateningly, but let the bear know you are human. Wave your arms slowly, talk in a calm voice, and walk away slowly in a lateral direction, keeping an eye on the bear. Unless you are very close to a car or a building, never run from bears. In a bear’s world, when something runs it is an open invitation to chase it. Bears will chase a running object even if they have no previous intention of catching it. Bears can run as fast as a racehorse, so humans have little or no chance of outrunning a bear.
- You see a bear; the bear sees you and stands on its hind legs: This means that the bear is seeking more information. Bears stand on their hind legs to get a better look, or smell, at something they are uncertain of. It is your cue to help it figure

out what you are. Help the bear by waving your arms slowly and talking to it. Standing is not a precursor to an attack. Bears do not attack on their hind legs. It is also important to remember that when a bear goes back down on all fours from a standing position, it may come towards you a few steps. This is normal, and probably not an aggressive act.

- The bear sees you, recognizes you as a human, but continues to come towards you slowly: This may mean several things, depending on the bear and the situation. It may mean that the bear does not see you as a threat, and just wants to get by you (especially if the bear is used to humans, as in a National Park); the bear wants to get food from you (if it has gotten food from people before); the bear wants to test your dominance (it views you as another bear); or may be stalking you as food (more common with black bear, but a rare occurrence). In all cases, your reaction should be to back off the trail very slowly, stand abreast if you are in a group, talk loudly, and/or use a noise-making device. If the bear continues to advance, you should stop. At this point, it is important to give the bear the message that if he continues to advance it will cost him. Continue to make loud noises and present a large visual image to the bear (standing abreast, open your coat). In bear language, bears assert themselves by showing their size. If an adult brown bear continues to come at you, climbing 20 feet or higher up a tree may also be an option if one is next to you (remember, never run from bears). Keep in mind, though, black bears can climb trees.
- The bear recognizes you as a human and acts nervous or aggressive: When bears are nervous or stressed they can be extremely dangerous. This is when it is important to try to understand what is going on in the bears mind. Nervous bears growl, woof, make popping sounds with their teeth, rock back and forth on their front legs, and often stand sideways to their opponent. A universal sign of a nervous bear is excessive salivation (sometimes it looks like they have white lips). When a bear shows any of these signs, stand where you are and talk in a calm voice. Do not try to imitate bear sounds, this may only serve to confuse and further agitate the bear. If you are in a group, stand abreast.
- The bear charges: If all other signals fail, a bear will charge. Surprisingly, most bear charges are just another form of their language. The majority of these are “bluff charges,” that is; the bear stops before making contact with their opponent. There are many different types of bluff charges ranging from a loping uncertain gait to a full-blown charge. If a bear charges, stand still.
- The bear attacks: When all else fails, a bear may attack. Attacks may be preceded by all of the behaviors previously described or they may be sudden. Seemingly unprovoked attacks are often the result of a bear being surprised (and feeling threatened), a bear defending its food cache, or a female defending her cubs. When a bear attacks, it typically runs with its body low to the ground, legs are stiff, ears are flattened, hair on the nape of the neck is up, and the bear moves in a fast, determined way. Front paws are often used to knock the opponent down and jaws are used to subdue it.

AFTER A BEAR ENCOUNTER

Black bears have been known to view humans as prey, and if you struggle with the attacking black bear, it will probably go elsewhere for its meal.

- Bear Sprays: Are easy to carry and use, little risk of permanent damage to bears and humans, effective in many situations. However, using a spray may change a false charge into a real charge, they are ineffective at ranges greater than 20 feet, ineffective in windy conditions, dangerous if accidentally discharged in a closed area such as an aircraft cockpit.

The most effective tool you have against an attacking bear is your brain. Although bears are intelligent animals, we are smarter and can often think our way out of a bad situation if we try.

ATTACHMENT 2

HAZARDS AND PRECAUTIONS – DEER

The following technical information, precautions, and guidelines for operations in which Deer may be encountered. The more the species are understood, the easier it will be to avoid contact with them thus preventing injury to ourselves and to the animals. All big game species are unpredictable and can be dangerous under certain conditions. This attachment is intended to provide information that will enable Weston to plan for encounters and to properly address face-to-face encounters.

WHITE-TAILED DEER

The White-tailed deer found throughout the eastern and western part of the United States have been known to attack people on many occasions. It is unknown whether Black-tailed deer have made any such attacks, but it is possible for someone to be injured by an irate buck in the breeding season (late fall). Deer are well equipped to injure humans. They are very fast. Bucks have sharp antlers and can clear amazingly high obstacles with graceful, arching leaps. They can run with remarkable speed, even in dense cover, and have excellent camouflage. When working in areas populated with deer, it is just common sense not to approach any large wild animal too closely. It is unlikely that an attack from a deer would be fatal but it is possible and serious injury is likely.

APPENDIX B - PICTURES OF POISONOUS SNAKES AND LIZARDS

Americas



American copperhead



Cotton Mouth – East and Southeast US



Timber Rattlesnake – Eastern US

FLD 46 CONTROL OF EXPOSURE TO LEAD

REFERENCES

29 CFR 1926.62

RELATED FLDs AND PROGRAMS:

Occupational Medical Monitoring Program

Personal Protective Equipment Program

Respiratory Protection Program

This FLD provides guidelines for controlling exposure to lead in the workplace. This WESTON-specific instruction applies corporate-wide and may require consultation and interpretation by a Certified Industrial Hygienist for unique applications.

Managers shall ensure employees are properly trained in the provisions of the standard prior to performing activities involving exposure to lead or lead compounds.

INTRODUCTION

Based upon limited differences in compliance requirements between the General Industry and the Construction Industry Standards WESTON policy is to follow compliance requirements as determined in 29 CFR 1926.62, "Lead Exposure in Construction" for all activities which involve occupational exposure to lead. The forms of lead to which the standard applies is defined to include metallic lead, all inorganic lead compounds, and organic lead soaps.

This practice applies to occupational exposure to lead at or above the Action Level (AL). Specific requirements for medical monitoring, respiratory protection, hygiene facilities, etc. are not mandated until exposure reaches the AL or the Permissible Exposure Level (PEL).

The lead standard includes requirements addressing exposure assessment, methods of compliance, respiratory protection, protective clothing and equipment, hygiene facilities and practices, medical surveillance, medical removal protection, employee information and training, signs, recordkeeping, and observation of monitoring.

The lead standard lists specific tasks which require conformance with the most restrictive portions of the standard until monitoring indicates otherwise. The tasks include; abrasive blasting, welding, cutting and burning of steel or structures containing or coated with lead or lead products.

Permissible Exposure Level (PEL) and Action Level (AL)

For both the general industry and the construction industry, the PEL for lead exposure is 50 μ g/m³ and the AL is 30 μ g/m³.

For exposures greater than an 8-hour day, the time-weighted average (TWA) for that day must be reduced according to the formula:

- Allowable employee exposure (in $\mu\text{g}/\text{m}^3$) = 400 divided by the hours worked that day.

Potential Sources of Exposure

For WESTON operations, potential sources of exposure include, but are not limited to; industrial hygiene surveys, wet-process paint chip sampling, and drilling operations where lead is present as a contaminant.

In addition, certain "Trigger Tasks" such as; welding and cutting on lead paint or lead-contaminated structures, dry sanding or scraping, soldering and pipe-fitting operations involving lead-containing materials and dry cleanup of lead contaminated surfaces are potential exposure operations. Specific monitoring and protection requirements follow.

Exposure Assessment and Initial Requirements

Each task conducted by WESTON personnel must be evaluated as to the potential for exposure to lead. In accordance with the standard, exposure is that which would occur regardless of the use of respiratory protection. Therefore, any concentration must be evaluated as to the potential for employee exposure at or above the AL.

Hygiene Surveys and Sampling Tasks

Previous data less than 12 months old may be used as the initial exposure assessment in order to determine appropriate levels of protection. This data must have been collected under workplace and environmental conditions closely resembling current task activities.

Defensible data from previous soil sampling efforts may be utilized for determining preliminary levels of protection, by inserting soils concentration data into the action levels formula. Refer to the Corporate Environmental Health and Safety Portal Site under "Technical Resources" for guidance on calculating Action Levels. Personal air sampling must still be performed in order to verify exposure until and/or unless comprehensive background data (reviewed by an industrial hygienist) are available to justify omitting personal sampling.

Other objective data may be utilized in lieu of initial monitoring provided the objective data is documented and appropriate for the materials and work processes/activities conducted.

Trigger Tasks

Until such time as an exposure assessment (either through personal air sample results or approved and documented historic data) has been conducted which indicates actual exposures, the following task-specific guidelines are applicable.

- Where lead-containing coatings or paint are present: Manual demolition of structures (e.g., dry wall), manual scraping, manual sanding, heat gun applications, and power tool cleaning with dust collection systems; and/or spray painting with lead paint. It will be presumed that the level of lead in the air is above the PEL but, below $500 \mu\text{g}/\text{m}^3$. The minimum respiratory protection for these activities is a properly fitted half-face respirator with N, R, or P100 filter cartridges. Respirators providing higher levels of protection may be used and an employee has the right to request a powered air-purifying respirator (PAPR) with N, R, or P100 Cartridges.
- Where activities involve using lead-containing mortar; lead burning where lead-containing coatings or paint are present: rivet busting; power tool cleaning without dust collection systems; cleanup activities where dry expendable abrasives are used; and abrasive blasting enclosure movement and removal, it will be presumed that the level of lead in the air is above the $500 \mu\text{g}/\text{m}^3$ but below $1250 \mu\text{g}/\text{m}^3$. The minimum respiratory protection for these activities is a loose-

fitting hood or helmet PAPR with N, R, or P100 filter cartridges; a hood or helmet supplied air respirator operated in continuous flow mode (e.g. type CE abrasive blasting helmet operated in continuous flow mode). A Quantitative Fit Test is required for use of respiratory protection for these activities. Respirators providing higher levels of protection may be used. For WESTON personnel the minimum respiratory protection is a tight fitting full face respirator with N, R, or P100 filter cartridges unless an exception is approved by a WESTON Certified Industrial Hygienist.

Note: An employee has the right to request a PAPR with N, R, or P 100 Cartridges.

- Where activities involve: Abrasive blasting, welding, cutting, or torch burning, the respiratory protection required is any supplied air respirator operated in positive pressure mode.
- For any activity where it is reasonably believed that exposure over the PEL will result, the respiratory protection is: Half- or Full-Face air purifying respirator (APR) with appropriate high efficiency filters; PAPRs with appropriate cartridges; or Supplied Air Respirators. Actual selection is dependent upon the potential for exposure.

Until the employee exposure assessment (personnel monitoring or approved historic data) has been performed and actual employee exposure has been determined, all employees performing the tasks described in the paragraphs above in this section must be supplied with interim protection as follows:

- Appropriate respiratory protection.
- Appropriate personal protective clothing and equipment.
- Change areas.
- Hand washing facilities.
- Biological monitoring.
- Training.

Monitoring

Initial Monitoring Requirements

The exposure assessment results will be used to determine whether any employee is being exposed to lead at or above the action level of $30\mu\text{g}/\text{m}^3$.

With the exception of allowances described below, monitoring for worker exposure requires collection of personal air samples which are representative of a full shift for each task involving known or potential exposure and any of the following, relevant considerations:

- Any information, observations, or calculations which would indicate employee exposure to lead;
- Any previous measurements of airborne lead; and
- Any employee complaints of symptoms which may be attributable to exposure to lead.

Note: Monitoring for the initial determination, where performed, may be limited to a representative sample of the exposed employees who the employer reasonably believes are exposed to the greatest airborne concentrations of lead in the workplace.

Historical Data

Where WESTON has previously monitored for lead exposures, such earlier monitoring results may be used to satisfy the requirements of initial monitoring and monitoring frequency, if the sampling and analytical methods meet the accuracy and confidence levels as indicated in paragraph of 29 CFR

1926.62(d)(9). Additionally, the data must have been obtained within the past 12 months during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the current operations.

Objective Data

Where objective data demonstrates that a particular product or material containing lead or a specific process, operation or activity involving lead cannot result in employee exposure to lead at or above the AL during processing, use, or handling, such data may be relied upon instead of performing initial monitoring.

An accurate record documenting the nature and relevancy of objective data used in assessing employee exposure in lieu of exposure monitoring, must be maintained.

Exception: Objective data, as described above, is not permitted to be used for exposure assessment in connection with the specific activities previously discussed as "Trigger Tasks".

Positive Initial Determination and Initial Monitoring

Where a determination shows the possibility of any employee exposure at or above the AL, monitoring must be conducted which is representative of the exposure for each employee in the workplace who is exposed to lead.

Negative Initial Determination

Where a determination is made that no employee is exposed to airborne concentrations of lead at or above the AL a written record of such determination must be made.

Frequency

If the initial determination reveals employee exposure to be below the AL, further exposure determination need not be repeated except as otherwise provided in the last paragraph of this section.

If the initial determination or subsequent determination reveals employee exposure to be at or above the AL, but at or below the PEL monitoring must be conducted at least every 6 months.

If the initial determination reveals that employee exposure is above the PEL, monitoring must be performed quarterly.

Whenever there has been a change of equipment, process, control, or personnel or a new task has been initiated that may result in additional employees being exposed to lead at or above the AL or may result in employees already exposed at or above the AL being exposed above the PEL, additional monitoring must be conducted in accordance with this practice.

Employee Notification

Each employee shall be notified in writing of the results which represent that employee's exposure within five working days after completion of the exposure assessment.

Whenever the results indicate that the representative employee exposure, without regard to respirators, is at or above the PEL a written notice is required stating that the employee's exposure was at or above that

level and includes a description of the corrective action taken or to be taken to reduce exposure to below that level.

Exposure monitoring records must be maintained as required in 29 CFR 1926.62(n)(1). Minimum information includes:

- Sampling data and procedures utilized.
- Description of sampling and analytical methods used.
- Type of respiratory protection used.
- Name, social security number, job classification for specific persons monitored and/or representative groups.
- Any environmental variables which could impact measurements.

Engineering Controls

As in all cases of potential or known exposure to a hazardous environment, engineering controls are to be evaluated as to effectiveness and appropriateness under the site-specific circumstances. Controls must be listed in the site-specific Health and Safety Plan (HASP) and implemented as appropriate or feasible. Appropriate engineering controls include dust suppression, use of longer torches in cutting operations, use of mechanical shears in lieu of torches, vacuum blasting methods, and local ventilation.

Ventilation

When mechanical ventilation is used to control lead exposure, the mechanical performance of the system must be evaluated and documented as to its effectiveness in controlling exposure.

Work Practice Controls

WESTON will not use administrative controls such as worker rotation as a means of reducing employees' TWA exposure to lead unless expressly approved by a qualified safety professional.

General Housekeeping

All surfaces shall be maintained as free as practicable of accumulations of lead.

Floors and other surfaces where lead accumulates shall, wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of lead becoming airborne.

Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and found ineffective.

Where vacuuming methods are selected, the vacuums shall be equipped with HEPA filters and used and emptied in a manner which minimizes the reentry of lead into the workplace.

Compressed air shall not be used to remove lead from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the airborne dust created by the compressed air.

Hygiene Facilities and Practices

In control zone areas where employees are exposed to lead above the PEL without regard to the use of respirators, food or beverage shall not be present or consumed, tobacco products shall not be present or used, and cosmetics shall not be applied.

Clean change areas shall be provided for employees whose airborne exposure to lead is above the PEL, without regard to the use of respirators.

To prevent cross-contamination, change areas, as needed, shall be equipped with separate storage facilities for protective work clothing and equipment and for street clothes.

Employees exposed to lead concentrations greater than the AL shall not leave the workplace wearing any protective clothing or equipment that is required to be worn during the work shift.

Shower facilities shall be provided, where feasible, for use by employees whose airborne exposure to lead is above the PEL. Adequate supplies, cleansing agents, and towels shall be provided.

Lunchroom facilities or eating areas shall be as free as practicable from lead contamination and readily accessible to employees.

Employees whose airborne exposure to lead is above the PEL, without regard to the use of a respirator, must wash their hands and face prior to eating, drinking, smoking or applying cosmetics.

Employees shall not enter lunchroom facilities or eating areas with protective work clothing or equipment which has been contaminated by surface lead dust in concentrations exceeding the AL.

Adequate hand washing facilities shall be provided for use by employees exposed to lead in concentrations exceeding the AL. These facilities must be designed in accordance with 29 CFR 1926.51(f). Where showers are not provided, employees must wash their hands and face at the end of the work-shift.

Note: Short-term (less than one week) field activities may utilize appropriate personal decontamination sequences such as those allowed under 29 CFR 1910.120 (HAZWOPER) in lieu of contained clean rooms, showers and change facilities.

Personal Protective Clothing and Equipment

Where exposures to lead above the AL (without regard to the use of respirators) have been validated by monitoring or where employees are exposed to lead compounds which may cause skin or eye irritation (e.g. lead arsenate, lead azide), and as interim protection for employees performing tasks as specified as “Trigger Tasks”, affected employees must use appropriate protective work clothing and equipment that prevents contamination of the employee and the employee's garments such as, but not limited to:

- Coveralls or similar full-body work clothing;
- Gloves, hats, and shoes or disposable shoe coverlets; and
- Face shields, vented goggles, or other appropriate protective equipment as necessary.
- Change areas in accordance with 29 CFR 1926.62(i)(2).
- Hand washing facilities in accordance with 29 CFR 1926.62(i)(5).

- Biological monitoring in accordance with 29 CFR 1926.62(j)(1)(i), to consist of blood sampling and analysis for lead and zinc protoporphyrin levels, and;
- Training as required under 29 CFR 1926.62(l)(1)(i) regarding 29 CFR 1926.59, Hazard Communication; training as required under 29 CFR 1926.62(l)(2)(ii)(C), regarding use of respirators; and training in accordance with 29 CFR 1926.21, Safety training and education.

The HASPs and fixed facility operating procedures must list specific and appropriate PPE that will be utilized for each task involving known or potential exposure to lead or lead compounds.

PPE utilized will be disposable garments. Personnel in maintenance or fixed operations may use re-useable garments only under the direction and approval of a qualified safety professional.

Garments will be disposed of at the end of a shift or upon leaving a controlled zone whichever comes first. Under no conditions will any employee be allowed to take contaminated garments with the employee to his or her home.

Proper decontamination of re-usable equipment/PPE must be conducted prior to allowing these materials to leave the site.

Contaminated protective clothing which is to be cleaned, laundered, or disposed of, must be placed in a closed container in the change area which prevents dispersion of lead outside the container.

Containers of contaminated (defined as when exposures are greater than or equal to the PEL) protective clothing and equipment must be labeled as follows:

"Caution: Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of lead contaminated wash water in accordance with applicable local, state, or federal regulations."

The removal of lead from protective clothing or equipment by blowing, shaking, or any other means which disperses lead into the air shall be prohibited.

Respirators

For WESTON operations, respirators shall be used in accordance with WESTON's Respiratory Protection Program in the following circumstances:

- Whenever an employee's exposure to lead exceeds the AL;
- In work situations in which engineering controls and work practices are not sufficient to reduce exposures to or below the AL;
- Whenever an employee requests a respirator; and
- As interim protection for employees performing "Trigger-tasks".

Respirators approved for use are limited to:

- Properly fitted half-face APRs with high-efficiency filters for concentrations not exceeding 500µg/m³.

- A loose fitting hood or helmet PAPR with N, R, or P100 filter cartridges; a hood or helmet supplied air respirator operated in continuous flow mode (e.g. type CE abrasive blasting helmet operated in continuous flow mode for concentrations not to exceed 1250 $\mu\text{g}/\text{m}^3$).
- Properly fitted full-face APRs with high efficiency filters for concentrations not in excess of 2,500 $\mu\text{g}/\text{m}^3$.
- Tight fitting full-facepiece PAPRs with high-efficiency filters for concentrations not in excess of 2,500 $\mu\text{g}/\text{m}^3$.
- Full-facepiece, positive-pressure supplied air respirators (SARs) for concentrations not in excess of 100,000 $\mu\text{g}/\text{m}^3$.
- Full-facepiece self-contained breathing apparatus (SCBA) for concentrations greater than 100,000 $\mu\text{g}/\text{m}^3$ or for unknown concentrations.

Respirators specified for higher concentrations can be used at lower concentrations of lead.

A full facepiece is required if the lead aerosols cause eye or skin irritation at the use concentrations.

Fit-testing must be conducted in accordance with WESTON's Respiratory Protection Program and 29 CFR 1910.134.

Signs and Labels

The following warning signs shall be posted in each work area where exposure to lead is above the PEL.

WARNING

LEAD WORK AREA

POISON

NO SMOKING OR EATING

Signs required by this paragraph must be illuminated and cleaned as necessary so that the legend is readily visible from all areas of approach to the work area.

Medical Surveillance

Initial medical surveillance in the form of blood testing shall be made available to employees occupationally exposed on any day to lead at or above the AL.

Biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels will be performed during initial medical surveillance and must be performed on the following schedule:

- For any employee anticipating work at a site or operation where the known or potential exposure (without regard to the use of respiratory equipment) equals or exceeds the AL, biological monitoring must be conducted prior to the start of that person's work on site or within 48 hours of such determination. Post-site work monitoring must be conducted within one week of that person's completion of site work. NOTE: This initial determination and need for blood testing should be reviewed by a Certified Industrial Hygienist; particularly if a negative determination is made. Appropriate documentation must be placed in the site files for future reference.

- During long-term (greater than 30 days) site activities for each employee with known or potential exposure to or greater than the AL for 30 or more days per year, at least every 2 months for the first 6 months and every 6 months thereafter.

Within 5 working days after the receipt of biological monitoring results, WESTON's medical consultant will notify each employee in writing of his or her blood lead level. The content of and review mechanisms for medical examinations made available shall be pursuant to 29 CFR 1926.62(j).

For any employee found to have a blood lead level at or above 40µg/100g of whole blood, testing will be performed every 2 months until two consecutive blood samples and analysis indicate a blood lead level below 40µg/100g of whole blood.

Medical Removal and Protection

WESTON will temporarily remove an employee from work having an exposure to lead at or above the AL on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to 29 CFR 1926.62(k) indicate that the employee's blood lead level is at or above 50 µg/dl.

WESTON will remove an employee from work having an exposure to lead at or above the AL on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

Note: Medical removal protections shall be strictly as interpreted under 29 CFR 1926.62(k) and other applicable Acts or Standards.

In the event any employee must be removed from work activities due to blood lead levels records and documents must be maintained in the project files as required in 29 CFR 1910.1025(n) or 1926.62(n).

Education and Training

All WESTON personnel with potential occupational exposure to lead will be provided with training, initially and annually thereafter, as to:

- Content of the standards 29 CFR 1910.1025 and 1926.62.
- The nature of operations which could result in exposure at or above the action level on any one day.
- Respirator use, selection and maintenance.
- Medical surveillance and medical removal requirements and protections.
- Health effects of lead.
- Engineering and work practice controls.
- WESTON's Lead Exposure Compliance Program and associated site specific plans.

Recordkeeping and Training

Documentation of training records in the form of training materials and attendance sheets will be maintained in the project files.

Exposure Assessments

Monitoring and data sheets used to determine employee exposures must be maintained on all sites with lead exposure. As required under 29 CFR 1910.20, copies of all documentation must be maintained in the project files.

Exposure assessment and monitoring records must include:

- The date(s), number, location and results of samples taken.
- The determination that the sampling procedures are representative of employee exposure.
- A description of the sampling and analytical procedures used.
- The type of respiratory protection used, if any.
- The name, employee number, and job classification of the employee(s) monitored.
- Environmental conditions encountered.

Objective data which is or will be used for determining exemption from initial monitoring as allowed under 29 CFR 1926.62(d)(3) must be maintained in the project files. Objective data utilized is required to be maintained for a period of at least 30 years.

Medical Surveillance

Medical surveillance will be conducted and records will be maintained in accordance with WESTON's Occupational Medical Monitoring Program requirements as indicated in 29 CFR 1910.1025(n) and/or 1026.62(n).

Task Specific Methods of Control

Based upon WESTON policy, each site activity involving potential exposure to lead must be identified and analyzed through a Task/Risk Analysis as a part of the site-specific HASP. This Task/Risk Analysis must identify methods, materials and equipment utilized in limiting exposure. Appendix 1 provides Actions/Requirements Based on Task. Appendix 2 provides a Task/Risk Analysis Inspection Checklist.

Current HASP forms can be obtained through the Division Environmental Health and Safety Manager, Corporate Environmental Health and Safety or on the WESTON EHS Portal Site.

Hazard Communication and Multi-Employer Sites

On multi-employer sites where the activities of one contractor/employer will or may have a direct impact with potential exposure to other contractors/employers, the Site Manager is responsible for contacting a representative of the potentially affected parties. The Site Manager will inform them of the lead exposure potential, control methods utilized, protective procedures to be followed, and the limits of lead contamination as known.

Inspections and Audits

The Project Manager is responsible for providing (at a minimum) weekly documented inspections of the work site. In accordance with the requirements of the lead standard these inspections must encompass all areas of the site where exposure to lead is at or above the PEL (Appendix 2). Additionally, any equipment, PPE, signs, and decontamination or disposal operations must be evaluated as to compliance with the standard and WESTON Policy regardless of the exposure concentration. Any non-compliance must be noted and corrected.

APPENDIX 1

ACTIONS/REQUIREMENTS BASED UPON TASK:

1. Exposure Less than Action Level (AL):

- Initial Exposure Assessment
- Hand Washing Facilities
- Proper Housekeeping
- Medical Removal Protection

2. Exposure at or over AL but less than Permissible Exposure Limit (PEL):

- Initial Exposure Assessment
- Hand Washing Facilities
- Periodic Exposure Monitoring
- Biological Monitoring and Recordkeeping
- Annual Training
- Proper Housekeeping
- Medical Removal Protection

3. Exposure at or over AL but less than the PEL (30 or more days/year):

- As above and
- Medical Examinations and Recordkeeping

4. Exposure at or greater than the PEL:

- Initial Exposure Assessment
- Hand Washing Facilities
- Periodic Exposure Monitoring
- Biological Monitoring and Recordkeeping
- Annual Training
- Proper Housekeeping
- Appropriate Respiratory Protection
- Warning Signs
- Proper PPE
- Proper Change Areas
- Decontamination Facilities/Showers as feasible
- Separate Eating Areas
- Medical Examinations and Recordkeeping
- Medical Removal Protection

5. Exposure to Trigger Tasks (until exposure is verified):

- See requirements under greater than PEL exposure

APPENDIX 2
TASK/RISK ANALYSIS AND INSPECTION CHECKLIST
FOR ACTIVITIES WITH POTENTIAL FOR LEAD EXPOSURE

This task involves the known or potential risk of exposure to lead or lead-containing materials. As such, requirements as indicated in 29 CFR 1910.1025 or 29 CFR 1926.62 and WESTON's Written Lead Exposure Compliance Program (FLD 46) will be followed.

Task Description:

Equipment Required/Used:

Training Required/Used:

Initial Exposure Determination: (Indicate Method[s] Used)

	Personal Sampling
	Objective Data (attach or indicate location of data)
	Historical Data (attach or indicate location of data)

PPE Includes:

	Respiratory Protection (specify)		Shoes or Shoe Covers (specify)
	Coveralls (disposable)		Face Shield, Goggles or Safety Glasses (specify)
	Coveralls (reusable)		Other (specify)
	Gloves (specify)		
	Head Covering (specify)		

Inspection Items:

Y/N	Item/Action
	Personnel are wearing appropriate PPE.
	PPE is in good condition.
	PPE is removed and disposed of in a manner to preclude airborne release of lead or lead compounds.
	Will clothing be laundered?
	If yes, then ensure notification of vendor as required.
	Will clothing be disposed of?
	If yes, container of disposable clothing and contaminated materials is closed and appropriately labeled.
	All surfaces are maintained (as practicable) free of lead or lead compounds.
	Appropriate methods and procedures are used for cleanup of surfaces with lead contamination.
	If vacuum is utilized, it is equipped with appropriate HEPA filter.
	If exposure is known or suspect to be at or greater than the PEL, then:
	There is no eating, drinking, cosmetic application, or tobacco consumption in contaminated areas.
	Change areas are available.
	Change areas are maintained to prevent cross-contamination of work and street clothing.
	No work clothing which has been known or is potentially contaminated is allowed to be worn off-site or in on-site clean areas.
	Clean, sanitary showers (where feasible) are maintained.
	All personnel shower prior to leaving the site at end of shift.
	Clean, sanitary eating areas are provided.
	Hand washing facilities are provided in all cases.
	Personnel are required to wash hands and face upon leaving the contaminated area.

Comments:

FLD 49 SAFE STORAGE OF SAMPLES

REFERENCE

DOT Emergency Response Guide (ERG)

To ensure that multi-media samples collected in the course of WESTON work assignments are not stored in a manner that creates undue hazard to WESTON employees or others.

PROCEDURE

Samples that are transported from a WESTON work location must be classified and packaged in compliance with U.S. Department of Transportation (DOT) regulations or alternatively in accordance with International Air Transport Association (IATA) regulations. WESTON's manual of Procedures for Shipping and Transporting Dangerous Goods must be consulted to determine if the samples will be classified as either "environmental" or "hazardous materials" samples.

Environmental Samples

Environmental samples are not subject to DOT or IATA dangerous goods regulations and must be packaged to protect their integrity during transportation and temporary storage and should have appropriate chain-of-custody documentation. These samples may be brought to a WESTON office location or rented space to verify sample documentation and repackaging (e.g., with ice or cold packs). Minor spill clean-up capability is required.

Once secured for shipment, these samples can be temporarily stored for the next day ground or air shipment pick-up. Under no circumstances are samples to be stored beyond the time necessary to arrange for transportation to a laboratory.

Hazardous Materials Samples

These samples are subject to DOT and/or IATA dangerous goods regulations and must be packaged and labeled according to the appropriate regulations, including completed chain-of-custody documentation prior to being transported from the WESTON work site. WESTON drivers must have the documentation for the samples and a DOT Emergency Response Guide (ERG) readily available in the vehicle. The ERG is available on-line at: <http://hazmat.dot.gov/pubs/erg/gydebook.htm> and appropriate sections can be copied to accompany samples being transported by vehicles driven by WESTON employees.

Under normal circumstances these samples should be shipped from the field and never brought back to a WESTON office location or into a rented space. If it is not possible to ship the samples from the field during the same day they are collected, a properly packaged, labeled, and sealed sample shipping container may be brought back to a WESTON office location for shipment to a laboratory the next business day - provided the temporary storage location is secure from access by any personnel who are not trained in shipping hazardous materials. Under no circumstances are samples to be stored in rented space; if necessary, secure temporary storage in a locked vehicle may be authorized. Note that some office leases do not permit the storage of hazardous materials and the lease will govern whether such materials can be stored overnight.

INSPECTION FOLLOW-UP

Shipping procedures for samples should be included in the site-specific health and safety plan (HASP) and reviewed for compliance with these procedures prior to approval. EHS audits will include a review to sample shipping and storage procedures.